SANYO

FILE NO.

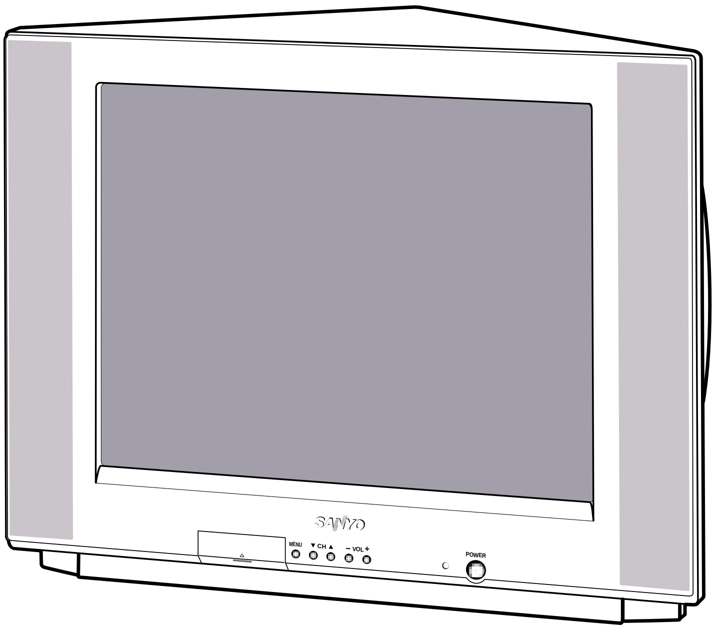
SERVICE MANUAL

Remote Control Color Television

DS20930

(U.S.A.)
(CANADA)
(MEXICO)

ORIGINAL VERSION



Chassis No. 20930-00

NOTE: Match the Chassis No. on the unit's back cover with the Chassis No. in the Service Manual.

If the Original Version Service Manual Chassis No. does not match the unit's, additional Service Literature is required. You **must** refer to "Notices" to the Original Service Manual prior to servicing the unit.

Contents

Specifications

Power Rating	120V, 60Hz
Antenna Input Impedance	75Ω UHF/VHF/CATV
Receiving Channel	2-13 (VHF), 14-69 (UHF), 01, 14-94, 95-125 (CATV)
Remote Ready	26 Key Remote Control
Sound Output	1 W/ch
Intermediate Frequency	
Picture IF Carrier	45.75MHz
Sound IF Carrier	41.25MHz
Color Sub Carrier	42.17MHz
Picture Tube	A51LVG896X
Semiconductors	
Integrated Circuits	9
Transistors	23
	Except within Tuner and RC Pre-Amp.
Cabinet Dimensions	
Width	587mm
Height	458mm
Depth	486mm

DS20930, C3RK, PRODUCT CODE 111351429

REFERENCE No. SM780088

SAFETY INSTRUCTIONS

SAFETY PRECAUTIONS

WARNING: The chassis of this receiver has a floating ground with the potential of one half the AC line voltage in respect to earth ground. Service should not be attempted by anyone not familiar with the precautions necessary when working on this type of equipment.

The following precautions must be observed:

1. An isolation transformer must be connected in the power line between the receiver and the AC line before any service is performed on the receiver.

2. Comply with all caution and safety-related notes provided on the side of the cabinet, inside the cabinet, on the chassis, and the picture tube.

3. When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as control knobs, adjustment covers, shields and barriers.

   DO NOT OPERATE THIS TELEVISION RECEIVER WITHOUT THE PROTECTIVE SHIELD IN POSITION AND PROPERLY SECURED.

4. Before replacing the back cover of the set, thoroughly inspect the inside of the cabinet to see that no stray parts or tools have been left inside.
   Before returning any television to the customer, the service technician must perform the following safety checks to be sure that the unit is completely safe to operate without danger of electrical shock.

ANTENNA COLD CHECK

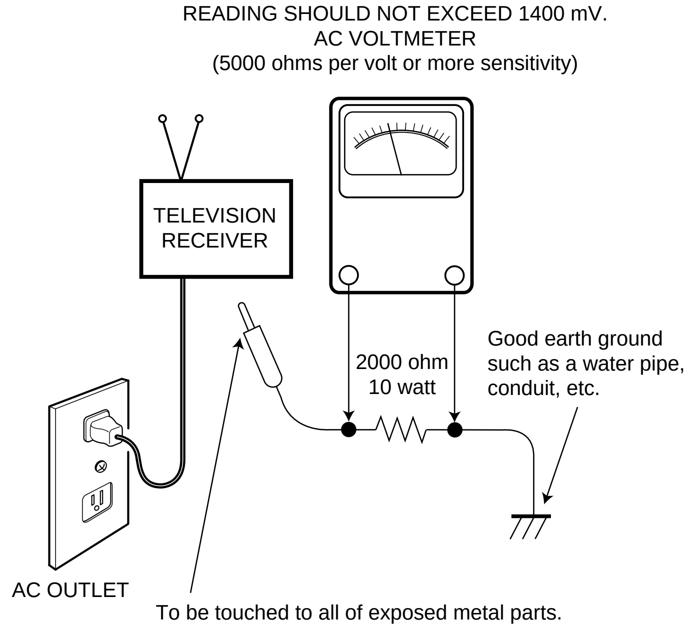
Remove AC plug from the 220 VAC outlet and place a jumper across the two blades. Connect one lead of an ohmmeter to the jumpered AC plug, and touch the other lead to each exposed antenna terminal (UHF and VHF antenna terminals). The resistance must measure 10M ohm or over. Any resistance value below this range indicates an abnormality which requires corrective action.

LEAKAGE CURRENT CHECK

Plug the AC line cord directly into a 220 VAC outlet. (Do not use an isolation transformer for this check.) Use an AC voltmeter, that has 5000 ohms per volt or more sensitivity. Connect a 2000 ohm 10 watt resistor, between a known good earth ground (water pipe, conduit, etc.) and all exposed metal parts of the cabinet (antennas, earphone jack, screwheads, metal overlays, control shafts, etc.). Measure the AC voltage across the 2000 ohm resistor.

The AC voltage should not exceed 1400 mV. A reading exceeding 1400 mV indicates that a dangerous potential exists. The fault must be located and corrected. Repeat the above test with the receiver power plug reversed.

NEVER RETURN A RECEIVER TO THE CUSTOMER WITHOUT TAKING THE NECESSARY CORRECTIVE ACTION.



Voltmeter Hook-up for Leakage Current Check.

X-RADIATION PRECAUTION

The primary source of X-RADIATION in solid-state receivers is the picture tube. The picture tube is specially constructed to limit X-Ray emission. For continued X-RADIATION protection, the replacement tube must be the same type as the original (including the suffix letter in the part numbers). Excessive high voltage may produce potentially hazardous X-RADIATION. To avoid such hazards, the high voltage must be maintained within specific limits. Refer to the X-RADIATION WARNING NOTE on the CHASSIS SCHEMATIC in this service manual for specific high voltage limits. If the high voltage exceeds specified limits, check the components specified on the chassis schematic diagram and take the necessary corrective action. Carefully follow the instructions for the +B Voltage Check and the High Voltage Check to maintain the high voltage within the specified limits.

PRODUCT SAFETY NOTICE

When replacing components in a receiver, always keep in mind the necessary product safety precautions. Pay special attention to the replacement of components marked with a star (★) in the parts list and in the schematic diagrams. To ensure safe product operation, it is necessary to replace those components with the exact same PARTS.

SERVICE ADJUSTMENTS

GENERAL

This set has an On-screen Service Menu system included in the CPU that allows remote operation for most of the service adjustments.

IC802 (EEPROM) REPLACEMENT

When IC802 (EEPROM) is replaced, IC801 (CPU) will automatically write the initial reference data into IC802 for basic TV operation. However, the bus data should be checked and some bus data should be set up before attempting the service adjustments. (See pages 4 ~ 6 for detailed information.)

INITIAL BUS DATA SETUP

Note: When IC802 (EEPROM) is replaced, the Service Menu NO. 03 HP (H Phase), NO. 07 VLN (V Lin), NO. 28 PRE (Preshoot Adj), NO. 37 AF (Auto Flesh), NO. 57 OPT (SA Option), and NO. 58 OP2 (SA Option 2) should be set up for proper TV operation before attempting the service adjustments.

1. Disconnect the AC power cord (AC 120V line).
2. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
3. Select NO. 23 POS (Pre/Over SW) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 1.
4. Select NO. 28 PRE (Preshoot Adj) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 2.
5. Select NO. 37 AF (Auto Flesh) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 1.
6. Select NO. 57 OPT (SA Option) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 100.
7. Select NO. 58 OP2 (SA Option 2) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 32.
8. Select NO. 63 SPO (Sub Bright Offset) with ▲ or ▼ key. Adjust the data with **+** or **–** key for 6.
9. Press the **MENU** key to turn off the Service Menu display.

ON-SCREEN SERVICE MENU SYSTEM

1. **Enter the Service Menu:**

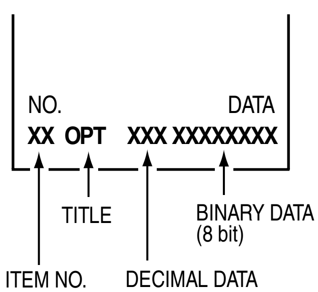


Figure 1. Service Menu Display

2. **Service Adjustments:**
   - Press the ▲ or ▼ key to select the desired service menu you want to adjust. (See pages 4 for On-screen Service Menu.)
   - Use the **+** or **–** key to adjust the data.

3. **Exit from the Service Menu:**
   - Press the **MENU** key to turn off the Service Menu display.

Table 1. ON-SCREEN SERVICE MENU

When IC802 (EEPROM) is replaced, check the bus data to confirm they are the same as below. The shaded menu should be checked and be set up or readjusted according to the procedures described in the following pages. Initial Setup Data marked with an * should be changed from Initial Reference Data. (See page 3 for Initial Bus Data Setup.)

No.	TITLE	INITIAL REFFERENCE DATA	INITIAL SETUP DATA	RANGE OF DATA	FUNCTION
01	HFR	29	29	0~63	Horizontal Frequency
02	AFC	0	0	0,1	AFC Gain & Gate
03	HP	15	15	0~31	Horizontal Phase (Horizontal Centering)
04	VS	64	64	0~127	Vertical Size
05	VPO	5	5	0~63	Vertical Position
06	VSP	0	0	0,1	Vertical Set Up (Sync. Sensitivity)
07	VLN	18	18	0~31	Vertical Linearity
08	CRS	0	0	0~3	Cross B/W
09	GRY	1	1	0,1	Gray Mode
10	VSC	8	8	0~31	Vertical S Correction
11	HBR	3	3	0~7	H BLK R
12	HBL	4	4	0~7	H BLK L
13	CDM	0	0	0, 1	C D Mode
14	VC	7	7	0~7	Vertical Compression
15	RB	0	0	0~255	Red Bias
16	GB	0	0	0~255	Green Bias
17	BB	0	0	0~255	Blue Bias
18	RD	64	64	0~127	Red Drive
19	GD	8	8	0~15	Green Drive
20	BD	64	64	0~127	Blue Drive
21	SBI	48	48	0~127	Sub Bias
22	OSD	3	3	0~3	OSD Contrast
23	POS	0	1*	0,1	Pre/Over SW
24	FLS	1	1	0~7	Filter System
25	CKO	3	3	0~7	Color Killer Operation
26	GYA	0	0	0,1	G-Y Angle
27	CRG	2	2	0~3	Coring Gain
28	PRE	1	2*	0~3	Pre Shoot Adjust
29	WP	1	1	0,1	White Peak Limiter
30	FSW	0	0	0,1	FBP Blanking Switch
31	VBL	0	0	0,1	Vertical Blanking Switch
32	BSG	2	2	0~3	Black Stretch Gain
33	BSS	1	1	0~3	Black Stretch Start
34	DCR	1	1	0~3	DC Reset
35	YGM	1	1	0~3	Y Gamma
36	CBP	0	0	0,1	C Bypass
37	AF	0	1*	0,1	Auto Flesh
38	BAT	4	4	0~7	Brightness ABL Threshold
39	MSD	0	0	0,1	Mid Stop Def.
40	ABL	0	0	0,1	Auto Brightness Limit
41	RYA	2	2	0~15	R-Y/B-Y Angle
42	RAD	15	15	0~63	RF AGC Delay
43	IAS	0	0	0,1	IF AGC
44	FMM	0	0	0,1	FM Mute
45	FL	15	15	0~31	FM Level

Table 1. ON-SCREEN SERVICE MENU (Continued)

When IC802 (EEPROM) is replaced, check the bus data to confirm they are the same as below. The shaded menu should be checked and be set up or readjusted according to the procedures described in the following pages. Initial Setup Data marked with an * should be changed from Initial Reference Data. (See page 3 for Initial Bus Data Setup.)

No.	TITLE	INITIAL REFFERENCE DATA	INITIAL SETUP DATA	RANGE OF DATA	FUNCTION
46	VL	4	4	0~7	Video Level
47	EWD	39	39	0~63	EW DC.
48	EWA	30	30	0~63	EW Amp.
49	EWT	34	34	0~63	EW Tilt
50	EWP	7	7	0~7	EW Corner Top
51	EWB	8	8	0~7	EW Corner Bottom
52	HSC	7	7	0~7	Horizontal Size Comp.
53	SB	32	32	0~63	Sub Brightness
54	SCO	7	7	0~31	Sub Color
55	STI	20	20	0~31	Sub Tint
56	SSH	12	12	0~31	Sub Sharpness
57	OPT	0	100*	0~255	Option (See Note 1 page 6.)
58	OP2	0	32*	0~255	Option 2 (See Note 2 page 6.)
59	HR	27	27	0~63	OSD Horizontal Position
60	ATT	7	7	0~63	Input Level
61	WDB	32	32	0~63	Wideband
62	SPC	32	32	0~63	Spectral
63	SBO	5	6*	0~255	Sub Brighatness Offset
64	PCO	40	40	0~63	PIP Color
65	PTI	40	40	0~63	PIP Tint
66	PUV	24	24	0~63	PIP Top Position
67	PDV	147	147	0~255	PIP Bottom Position
68	PLH	40	40	0~63	PIP Left Position
69	PRH	101	101	0~255	PIP Right Position
70	PCN	52	52	0~63	PIP Y level
71	PBS	15	15	0~63	PIP BGP Phase
72	DRV	64	64	0~127	Red Drive Adjustment (See Note 3 page 6.)
		64	64	0~127	Blue Drive Adjustment (See Note 3 page 6.)
73	–	0	0	0~255	Red Bias Adjustment (See Note 4 page 6.)
	–	0	0	0~255	Green Bias Adjustment (See Note 4 page 6.)
	–	0	0	0~255	Blue Bias Adjustment (See Note 4 page 6.)

SERVICE ADJUSTMENTS (Continued)

PROGRAM CODES

The microprocessor used in this model is a multi-purpose type and is used in several different models. To ensure proper operation and the correct features for your particular model, the Program Codes must be correct.

Note 1. Option Data 1 (No. 57 OPT) should be decimal 100 (01100100 binary). See page 3 INITIAL DATA SETUP, step 6, for set up procedure. If this program code is wrong, the TV will not operate properly.

No. 57 OPT			
BIT	**FUNCTION**	**DATA**	
		0	**1**
0,1	TV HOTEL MONITOR	00: TV 01: HOTEL 10: MONITOR 11: INHIBITED (=TV)	
2	VIDEO INPUT	NONE	YES
3,4	CLOCK	NOT USED	
5	STEREO/MONO	MONO	STEREO
6,7	SURROUND	00: NONE 01: YES 10: NOT USED 11: NOT USED	

Note 2. Option Data 2 (No. 58 OP2) should be decimal 32 (00100000 binary). See page 3 INITIAL DATA SETUP, step 7, for set up procedure. If this program code is wrong, the TV will not operate properly.

No. 58 OP2			
BIT	**FUNCTION**	**DATA**	
		0	**1**
0	V-GUIDE	YES	NONE
1	COLOR ENHANCER	NOT USED	
2	INITIAL CHANNEL	NOT USED	
3	NOT USED	NOT USED	
4	PIP	NOT USED	
5	AV1/AV1, AV2	AV1	AV1, AV2
6	TONE/BASS, TREBLE	NOT USED	
7	GAME KEY	NONE	YES

DRIVE / BIAS ADJUSTMENTS

Note 3. Red/Blue Drive Adjustments in Service Menu No. 72 DRV: Adjust Red and Blue Drive Levels alternately with 1, 3, 7, and 9 keys on the remote control. (See Figure 2.) The Drive Level adjustment data will be rewritten in the Service Menu No. 18 and 20 automatically.

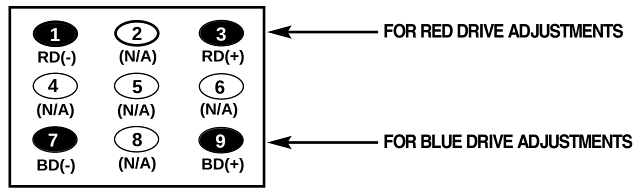


Figure 2.

Note 4. Red/Green/Blue Bias Adjustments in Service Menu No. 73: Adjust each Bias Level with 1, 3, 4, 6, 7, or 9 key on the remote control. (See Figure 3.) The Bias Level adjustment data will be rewritten in the Service Menu No. 15 ~ 17 automatically.

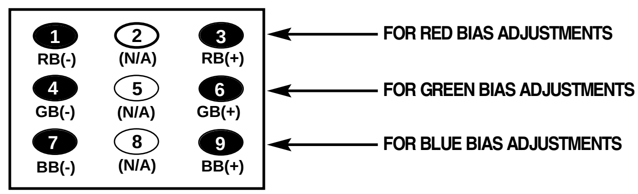


Figure 3.

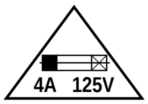
ANTENNA CONNECTIONS

This receiver is designed for UHF/VHF reception. A 75 ohm terminal is provided for UHF and VHF receptions. When connecting a CATV antenna system, connect the 75 ohm coaxial cable directly to the 75 ohm terminal. For 300 ohm VHF antenna, use the adapter (included with the TV set).

CIRCUIT PROTECTION

Fuse F601 (4A) is included in the AC line. This fuse must be replaced with the proper fuse. (See Parts List.)

CAUTION FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE, REPLACE ONLY WITH THE SAME TYPE 4A, 125V FUSE.



ATTENTION: POUR MAINTENIR LA PROTECTION CONTRE LES RISQUES D' INCENDIE UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE 4A, 125V.

+B VOLTAGE CHECK

Connect voltmeter + lead to TJ1 130V and – lead to ground (TE7). Connect receiver to AC 120V line. Tune receiver to an active channel. Reset the picture controls to the FACTORY PRESET levels (press remote control **RESET** key twice). Voltage must measure between +128.0V and +132.0V. If the voltage is out of this range, the power circuit must be checked. No +B adjustment is provided on this chassis.

HORIZONTAL CENTERING ADJUSTMENT

1. Tune receiver to an active channel.
2. Check that picture is in the horizontal center of TV screen. If picture is too right or left, perform steps 3 ~ 6.
3. Turn off the receiver and disconnect the AC power cord.
4. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
5. Select No. 03 HP (Horizontal Phase) with ▲ or ▼ key.
6. Adjust the data with + or – key for horizontal center. To turn off the Service Menu display, press the **MENU** key.

VERTICAL SIZE ADJUSTMENT

1. Tune receiver to an active channel.
2. Check the vertical size of the picture. If the vertical size is too large or small, perform steps 3 ~ 6.
3. Turn off the receiver and disconnect the AC power cord.
4. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
5. Select No. 04 VS (Vertical Size) with ▲ or ▼ key.
6. Adjust the data with + or –key for full scan. To turn off the Service Menu display, press the **MENU** key.

VERTICAL CENTERING ADJUSTMENT

1. Tune receiver to an active channel.
2. Check that picture is in the vertical center of TV screen. If picture center is too low, add a cutting wire to R513.

VCO ADJUSTMENT

Note: VCO must be adjusted after IC101 (Signal Processor), IC802 (EEPROM) or T151 (IF VCO Coil) is replaced.

1. Tune receiver to an active channel.
2. Set the picture controls to the Sports level.
3. Connect digital voltmeter + lead to pin 58 of IC101(TP10) and – lead to ground (TE 7).
4. Confirm a reading of 3.6 ±0.6 VDC.
5. If voltage is out of specifications adjust T151 for 3.6 ±0.6 VDC.

RF-AGC ADJUSTMENT

1. Tune receiver to strongest VHF station in your area.
2. Set contrast and brightness controls for maximum.
3. Turn off the receiver and disconnect the AC power cord (120V AC line).
4. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
5. Select No. 42 RAD (RF AGC Delay) with ▲ or ▼ key.
6. Adjust the data with + or – key in the direction which causes snow to appear, then in the opposite direction until the snow just disappears.

VIDEO LEVEL

1. Connect color-bar generator to antenna terminal.
2. Turn off the receiver and disconnect the AC power cord (120V AC line).
3. Connect oscilloscope to TP16(Q202 emitter) and ground.
4. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
5. Select No. 46 VL (Video Level) with ▲ or ▼ key.
6. Adjust the + or – key for an oscilloscope reading of 1.0±0.1 Vp-p at TP16. Press the **MENU** key to turn off the Service Menu display.

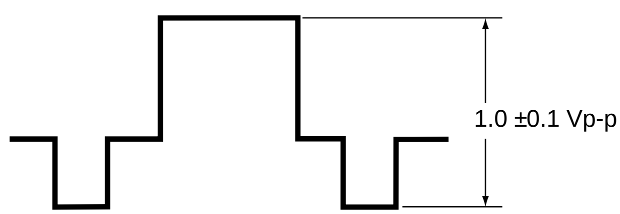


Figure 4.

SERVICE ADJUSTMENTS (Continued)

GRAYSCALE ADJUSTMENT

1. Set the picture controls to the Sports levels or Reset (use MENU key and ▲ or ▼ key or RESET key).
2. Turn off the receiver and disconnect the AC power cord (120V AC line).
3. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
4. Select No. 15 RB (Red Bias), No. 16 GB (Green Bias), and No. 17 BB (Blue Bias) with ▲ or ▼ key and set each data to 0 with + or – key.
5. Select No. 18 RD (Red Drive) and No. 20 BD (Blue Drive) with ▲ or ▼ key and set each data to 64 with + or – key.
6. Set No. 19 GD (Green Drive Reduction) data to 8, No. 53 SB (Sub Brightness) data to 32, NO. 54 SCO (Sub Color) data to 7, NO. 55 STI (Sub Tint) to 20, and NO. 56 SSH (Sub Sharpness) data to 12 with ▲ or ▼, and + or – keys.
7. Turn Screen Control (T402) to minimum (fully counterclockwise).
8. Select the Service Menu No. 73 (Bias Adjustments) with ▲ or ▼ key.
9. Advance Screen Control (T402) clockwise to obtain just visible one color line. If line does not appear, place this control to maximum (fully clockwise).
10. Raise each Bias Level with **3**, **6**, and **9** keys to obtain just visible white line. (See Figure 5 below.)

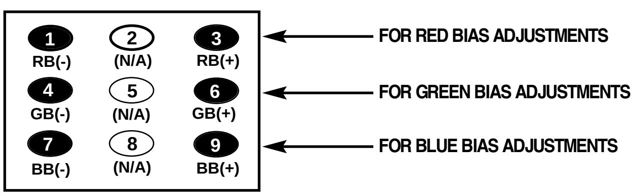


Figure 5. Remote Control Number keys' functions in Service Menu No. 73

11. Select the Service Menu No. 72 DRV (Drive Adjustments) with ▲ or ▼ key.
12. Adjust Red and Blue Drive Levels alternately with **1**, **3**, **7**, or **9** key to produce normal black and white picture in highlight areas. (See Figure 6.)

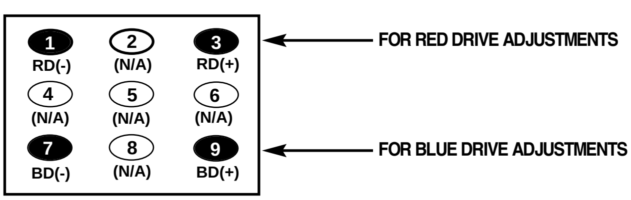


Figure 6. Remote Control Number keys' functions in Service Menu No. 72 DRV

13. Check for proper grayscale at all brightness levels. To turn off the Service Menu display, press the **MENU** key.

Note: If Grayscale Adjustment is made after picture tube replacement, make Brightness Level Adjustment.

FOCUS ADJUSTMENT

Adjust focus control (T402) for well defined scanning lines.

BRIGHTNESS LEVEL ADJUSTMENT

Note: Grayscale, RF AGC, Video Level, and High Voltage Check must be adjusted before attempting Brightness Level Adjustment.

1. Connect a color-bar generator to the antenna terminal.
2. Switch the generator to the crosshatch pattern.
3. Reset the picture controls to the Sports levels.
4. Connect voltmeter (high impedance) + lead to terminal TP51 and – lead to terminal TP50 on main board. Set voltmeter for 1.5V~3.0V range.
5. Turn off the receiver and disconnect the AC power cord (120V AC line).
6. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
7. Select No. 53 SB (Sub Brightness) with ▲ or ▼ key.
8. Adjust the data with + or – key for 650mVDC.
9. Press the **MENU** key to turn off the Service Menu display.
10. Check brightness level on every active channels, readjust (repeat steps 5~9), if necessary.

Note: Do not set to excessive brightness level, otherwise the contrast level will be suppressed.

HIGH VOLTAGE HOLD-DOWN TEST

Every time the receiver is serviced, the HIGH VOLTAGE HOLD -DOWN circuit must be tested for proper operation by following these steps;

1. Connect receiver to 120V AC line. Tune receiver to active channel. Reset the picture controls to the Sports levels.
2. Check that the voltage measured between TP7 and TE7 (ground side) is within 16.5 VDC to 21 VDC. If the voltage is out of this range, the Hold-Down Circuit must be checked.
3. Connect a DC Voltage supply to TP7 and TE7 through a 100 ohm 1/4W resistor. Adjust the DC voltage to 23VDC. The receiver should shutdown, losing raster and sound. Then the receiver should turn off automatically. This reaction indicates that the Hold-Down circuit is functioning properly. If the receiver goes not shutdown, a malfunction is indicated and its cause **must** be found and corrected.
4. To obtain picture again, remove the DC Supply and wait a few minutes. Now turn on the receiver.

SOUND ADJUSTMENT

1. Connect a color-bar generator to the antenna terminal with audio signal of 1KHz at 100% modulated.
2. Set the picture controls to the Sports levels.
3. Connect oscilloscope + lead to TP21 (base Q135) and – lead to ground.
4. Turn off the receiver and disconnect the AC power cord (120V AC line).
5. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
6. Select No. 45 FL (FM Level) with ▲ or ▼ key.
7. Adjust the data with + or – key for an oscilloscope reading of 0.693 ±10% Vp-p at TP21.
8. Press the **MENU** key to turn off the Service Menu display and disconnect the oscilloscope fromthe chassis.

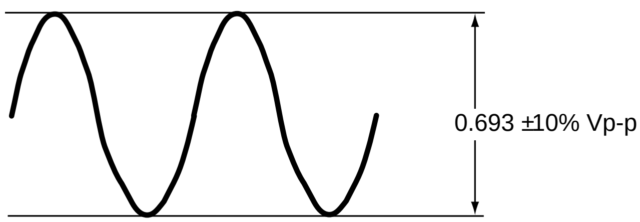


Figure 7.

MULTI-SOUND SECTION ADJUSTMENTS

Note: Multi-Sound Section must be adjusted after IC101 (Signal Processor), IC3401 (MTS Decoder) or IC802 (EEPROM) is replaced.

INPUT LEVEL ADJUSTMENT

1. Connect a signal to the antenna terminal with audio signal of 1KHz at 100% modulated.
2. Turn off the receiver and disconnect the AC power cord (120V AC line).
3. Connect voltmeter (RMS) to TP317 and ground.
4. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
5. Select NO. 60 ATT (Attenuation) with ▲ or ▼ key.
6. Adjust the + or – key for a voltmeter reading of 400 ±20 mVrms at TP317.

SEPARATION ADJUSTMENT

7. Turn off the receiver and disconnect the AC power cord (120V AC line).
8. Connect oscilloscope CH1 to TP317 and CH2 to TP318 and ground.
9. Connect an MTS TV/Stereo generator to antenna terminal.
10. While pressing the **MENU** key, reconnect the AC power cord. The Service Menu display will now appear.
11. Select pilot , 300Hz audio frequency and Left modulating signal.
12. Select NO. 61 WDB (Wideband) with ▲ or ▼ key.
13. Adjust the + or – key for minimum low frequencies at TP317.(See Figure 8.)
14. Select 4K Hz audio frequency and Right modulating signal.
15. Select NO. 62 SPC (Spectral) with ▲ or ▼ key.
16. Adjust the + or – key for minimum high frequencies at TP318.(See Figure 8.)

Repeat adjustment (steps 11-16) until no further decrease in amplitude can be obtained. Press the **MENU** key to turn off the Service Menu display.

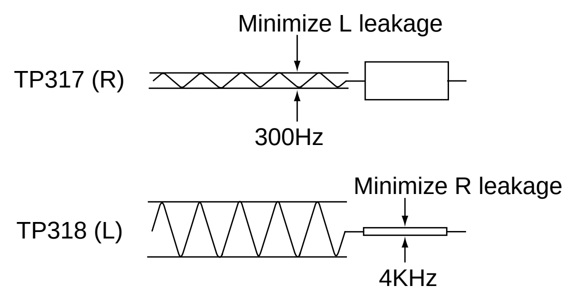


Figure 8. Separation Adjustments

PURITY AND CONVERGENCE ADJUSTMENTS

CAUTION: Purity and Convergence adjustments have been made at the factory. Readjustments should be made only after the picture tube or deflection yoke is replaced. Follow the steps below for the necessary readjustments.

PURITY ADJUSTMENT

1. When replacing picture tube or deflection yoke, mount deflection yoke and purity-convergence magnets assembly properly. See Figure 1. Position the picture tube facing east or west. Demagnetize the picture tube and receiver using an external degaussing coil. Set receiver to TV Service Menu No. 73 (no vertical sweep) while degaussing.
2. Place the yoke on tube neck fully forward against glass. Place the CPM on the tube neck aligning the center of the purity magnet tabs (2 pole) over center of Focus Gap (G3 & G4). See Figure 2.
3. Connect a color bar generator to the antenna terminal. Switch the generator to a white field. Move yoke backward on the neck until a uniform white field is obtained.
4. Allow 30 minutes warm up on a blank white field (high intensity grayscale).
   Note: If white field cannot be obtained, check Grayscale Adjustments on page 6.
5. Set the picture controls to the Auto levels. Select a green raster, either with the signal generator or by adjusting the bias controls. If a signal generator is used for this step, Skip to Step 10. If the bias controls will be used, go to step 6.
6. Adjust TV Service Menu No. 15 RB (R-Bias), No. 16 GB (G-Bias), and No. 17 BB (B-Bias) data to 0 each.
7. Select TV Service Menu No. 73 (no vertical sweep).
8. Adjust the screen control counterclockwise until the horizontal scan lines is no longer visible.
9. Select TV Service Menu No. 16 GB (G-Bias) and raise the data to produce green raster. If retrace lines appear, reduce screen control slightly.
10. Pull yoke back on the tube neck to obtain three-color raster (blue, green and red).
11. Adjust the angle between the two purity magnet tabs to center the vertical green belt in the picture tube. Do not rotate tabs. See Figure 3.
12. Slowly slide the deflection yoke forward until a uniform green screen is obtained.
13. Check the purity of the red and blue screens for uniformity. Turn off other colors to check (use bias controls) or use generator. If necessary, readjust the yoke position until all screens are pure.
14. If bias controls and screen control were used to set purity, reset Grayscale. Refer to Grayscale Adjustment on page 6.
15. Confirm that the yoke is not tilted. Tighten the yoke mounting screw. Adjust convergence next.

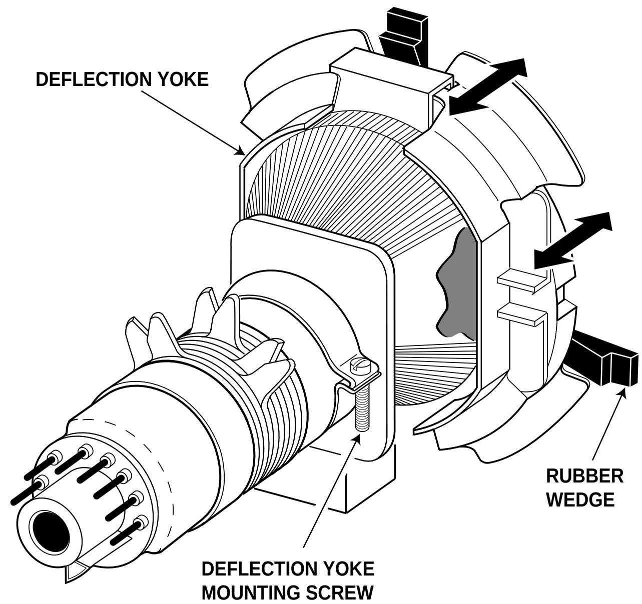


Figure 1. Deflection Yoke Movement

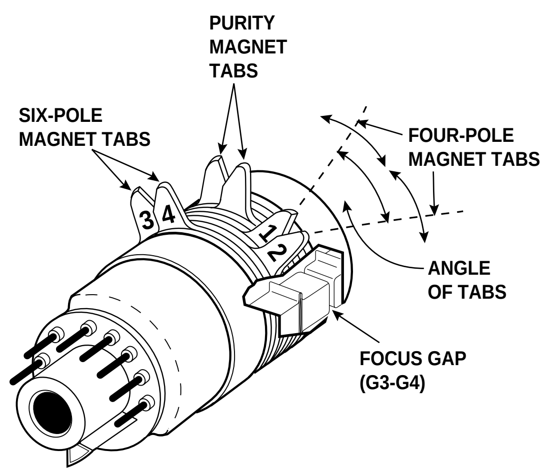


Figure 2. Purity and Convergence Magnets

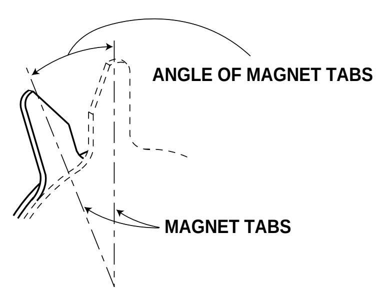


Figure 3. Adjusting Magnet

CONVERGENCE ADJUSTMENT

CENTER CONVERGENCE ADJUSTMENT

1. Connect a crosshatch generator to antenna terminals.
2. Set Contrast control to low level to eliminate Blooming. Reduce Brightness level to obtain black background if necessary.
3. Adjust the angle between the four-pole magnet tabs 1 and 2 (Figure 2), and superimpose the red and blue vertical lines in the center area of the picture screen. See Figure 4.
4. Keeping the tabs at the same angle, rotate them together to superimpose the blue and red horizontal lines in the center area of the picture screen. See Figure 4.
5. Adjust the six-pole magnet tabs 3 and 4 so the converged red/blue line is superimposed on the green line. This is the same procedure used in Steps 3 and 4. See Figure 5.

OUTER AREA CONVERGENCE ADJUSTMENT

The outer area convergence is performed by positioning of the yoke as follows:

1. Move the top of the yoke toward or away from the picture tube. This movement will affect the vertical lines at the top and bottom and the horizontal lines at the sides. See Figure 6.
2. Check that splits at 12 O'Clock and 6 O'Clock positions are minimized, adjust yoke for best compromise. Secure with wedge at 12 O'Clock position. See Figure 1.
3. Move the side of the yoke toward or away from the picture tube to converge the horizontal lines at the top and bottom and the vertical lines at the sides. See Figure 7.
4. Check that splits at 12 O'Clock and 6 O'Clock are minimized, adjust yoke for best compromise. Secure yoke position with the side wedges. See Figure 1.

Note: When reusing the rubber wedges, apply a small amount of silicone rubber adhesive or hot melt to each of the wedges.

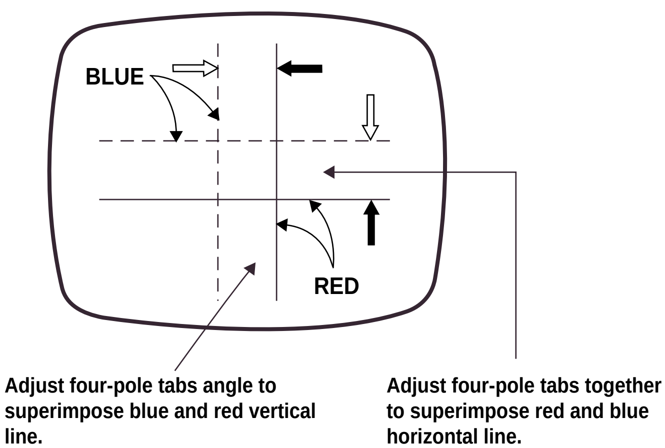


Figure 4. Blue an Red Line Movement

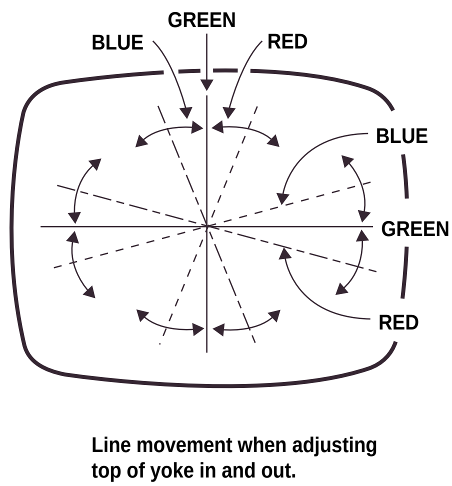


Figure 6. Top of Yoke Movement

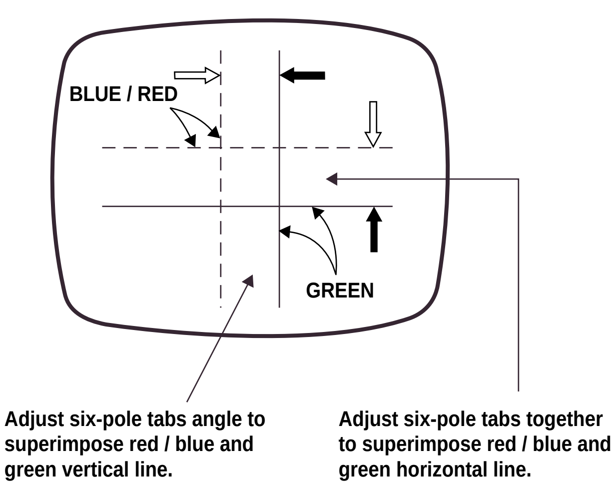


Figure 5. Blue/Red and Green Line Movement

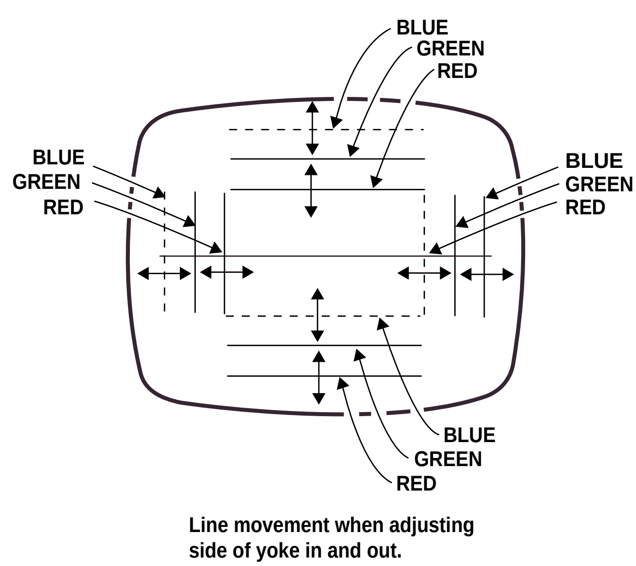


Figure 7. Side of Yoke Movement

SERVICE HINTS

POWER FAILURE DETECTOR

This set is equipped with a Power Failure Detector function included in the CPU which checks for an abnormal condition in the chassis power supplies, including the power supply derived from the Horizontal Output Transformer.

If, while the power is on, a failure is caused by any of the following that results in a low voltage supply, the CPU will turn the unit off in 1.5 seconds to prevent unnecessary damage:

- Failure within the power supply circuits.
- A short circuit in the load side from the supply.
- Stoppage of the Horizontal Output Oscillator caused by the X Radiation protection Hold-Down Circuit.

If, while the power is off, the power is switched on and any of these failures remains uncorrected, the CPU will shut off the power within three seconds.

Check the following if the unit is turned off by the power failure detector.

1. Disconnect the AC power cord (120V AC line) for at least 10 seconds.
2. Connect a DC Voltmeter to the following TEST POINTS.

TJ6	**5V**
D429 Cathode	**5V**

3. Press the power key and check for the proper voltage supplies.
4. If any of these voltages is low, the power failure detector should turn the set off within three seconds.
5. Check all circuits listed above.

Note: This unit is equipped with a Power Surge Protection feature included in the CPU. If power Failure occurs three times within 15 minutes, the CPU will automatically stop functioning to help prevent secondary damage. (TV will not turn on by pressing the power key.) To reset the operating programs within the CPU, disconnect the AC power cord for at least 10 seconds.

MECHANICAL DISASSEMBLIES

CABINET BACK REMOVAL

1. Refer to Figure 1, remove 8 screws.
2. Pull off cabinet back and remove.

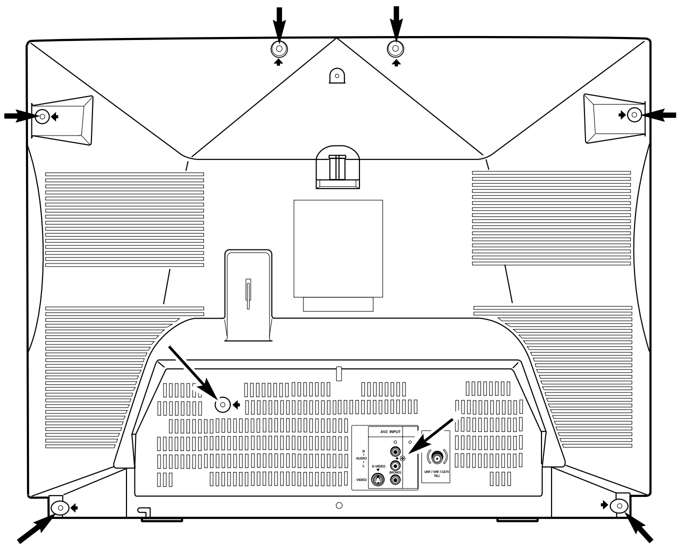


Figure 1. Cabinet Back Removal

CHASSIS REMOVAL

1. Remove cabinet back.
2. Discharge the picture tube anode (2nd anode lead) to the dag coating (picture tube grounding lead).
3. Disconnect Degaussing coil socket (KD), Picture tube socket, Deflection yoke connector (KDY), Speaker connectors (KSP), and 2nd anode lead.
4. Remove chassis completely by sliding it straight back.

PICTURE TUBE REMOVAL

CAUTION: Do not disturb the deflection yoke or magnet assembly on the picture tube neck. Care must be taken to keep these assemblies intact, unless picture tube is being replaced . Discharge the picture tube to the coating before handling the tube.

1. Remove chassis, referring to Chassis Removal instructions.
2. Place cabinet's front face down on the soft surface.
3. Remove the screw on each corner of the picture tube and GENTLY lift the picture tube out of the cabinet.
4. Install a replacement picture tube in reverse order. Properly install the degaussing coil and picture tube grounding lead on the picture tube. See Figure 2.

Note: If the Picture Tube is being replaced, mount the Degaussing Coil on the picture tube. See Figure 2.

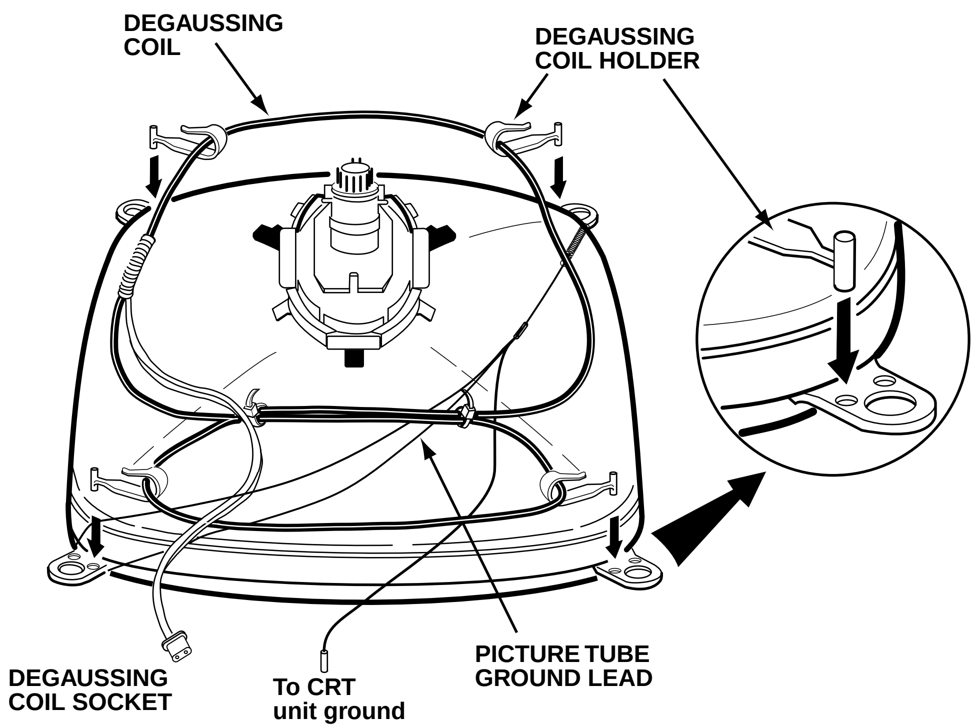


Figure 2. Picture Tube Removal

CHASSIS ELECTRICAL PARTS LIST

CAUTION: To Protect against electrical shock and for continued product safety, refer to SAFETY PRECAUTIONS, X-RADIATION PRECAUTION and PRODUCT SAFETY NOTICE on Page 2.

PRODUCT SAFETY NOTICE

PRODUCT SAFETY SHOULD BE CONSIDERED WHEN A REPLACEMENT IS MADE IN ANY AREA OF A RECEIVER. COMPONENTS INDICATED BY A STAR (★) IN THIS PARTS LIST AND THE SCHEMATIC DIAGRAM DESIGNATE COMPONENTS IN WHICH SAFETY CAN BE OF SPECIAL SIGNIFICANCE. IT IS PARTICULARLY RECOMMENDED THAT ONLY PARTS DESIGNATED ON THE FOLLOWING PARTS LIST BE USED FOR COMPONENT REPLACEMENT DESIGNATED BY A STAR. NO DEVIATIONS FROM RESISTANCE, WATTAGE, AND VOLTAGE RATINGS MAY BE MADE FOR REPLACEMENT ITEMS DESIGNATED BY A STAR.

Notes: Parts having Location Number are located on the following boards.
Numbers under 700 Series . . . . .On the Main Board.
Numbers 700 Series . . . . .On the Picture Tube Socket Board.
Numbers 800 Series . . . . .On the Main Board
Numbers 900 Series . . . . .Out of Board.
Numbers 1000 Series . . . . .On the Main Board.
Numbers 1100 series . . . . .On the Main Board
Numbers 1900 series . . . . .On the Main Board

Note: Schematic part location numbers may not always match with the part descriptions.
The part descriptions are correct and should be used.

Schematic Location	Part No.	Description

CAPACITORS

NOTES:
Read description of the Capacitor as follows:

(Example)
CERAMIC 100P K 50V

- 50V — Rated Voltage
- K — Tolerance Symbols:

less than 10PF
A . .Not specified
B . .±0.1PF C . .±0.25PF
D . .±0.5PF F . .±1PF
G . .±2PF R . .+0.25 - 0PF
S . .+0 - 0.25PF E . .+0 - 1PF

more than 10PF
A . .Not specified
B . .±0.1% C . .±0.25%
D . .±0.5% F . .±1%
G . .±2% H . .±3%
J . .±5% K . .±10%
L . .±15% M . .±20%
N . .±30% P . .+100 - 0%
Q . .+30 - 10% T . .+50 - 10%
U . .+75 - 10% V . .+20 - 10%
W .+100 - 10% X . .+40 - 20%
Y . .+150 - 10% Z . .+80 - 20%

- 100P — Rated Value: P...Pico Farad U...Micro Farad
- CERAMIC — Material:

CERAMIC . . . . . .Ceramic
MT-PAPER . . . . .Metalized Paper
POLYESTER . . .Polyester
MT-POLYEST . . .Metalized Polyester
POLYPRO . . . . .Polypropylene
MT-POLYPRO . .Metalized Polypropylene
COMPO-FILM . .Composite Film
MT-COMPO . . . .Metalized Composite
STYRENE . . . . .Styrene
TA-SOLID . . . . . .Tantalum Solid
AL-SOLID . . . . . .Aluminum Solid
ELECT . . . . .Electrolytic
NP-ELECT . . . . .Non-Polarized Electrolytic
OS-SOLID . . . . .Aluminum Solid with Organic Semiconductive Electrolytic

Schematic Location	Part No.	Description		
C001	403 048 1907	ELECT	0.22U M	50V
C002	403 048 1907	ELECT	0.22U M	50V
C003	403 155 2408	CERAMIC	5600P K	50V
C004	403 155 2408	CERAMIC	5600P K	50V
C006	403 215 2201	CERAMIC	0.01U K	50V
C010	403 045 7803	ELECT	220U M	25V
C011	403 045 7803	ELECT	220U M	25V
C012	403 042 7707	ELECT	22U M	16V
C015	403 043 6006	ELECT	330U M	16V
C101	403 039 3507	ELECT	470U M	6.3V
C103	403 215 2201	CERAMIC	0.01U K	50V
C106	403 049 9803	ELECT	2.2U M	50V
C131	403 049 0008	ELECT	1U M	50V
C133	403 215 2201	CERAMIC	0.01U K	50V
C134	403 113 3805	CERAMIC	1000P K	50V
C136	401 105 7909	MT-GLAZE	0.000 ZA	1/16W
C137	403 166 9205	CERAMIC	10P J	50V
C141	403 215 2201	CERAMIC	0.01U K	50V
C142	403 284 4304	CERAMIC	0.022U K	50V
C143	403 215 2201	CERAMIC	0.01U K	50V
C146	403 215 2201	CERAMIC	0.01U K	50V
C147	403 038 1603	ELECT	100U M	6.3V
C151	403 048 6308	ELECT	0.47U M	50V
C153	403 048 6308	ELECT	0.47U M	50V
C161	403 305 3507	CERAMIC	0.1U Z	50V
C211	403 086 2300	NP-ELECT	1U M	50V
C212	403 049 9803	ELECT	2.2U M	50V
C221	403 086 2300	NP-ELECT	1U M	50V
C251	401 105 7909	MT-GLAZE	0.000 ZA	1/16W
C252	404 086 6602	POLYESTER	0.047U K	63V
	403 062 0306	POLYESTER	0.047U K	50V
	403 062 0504	POLYESTER	0.047U K	50V
	403 179 0909	POLYESTER	0.047U K	50V
C253	403 048 6308	ELECT	0.47U M	50V
C256	403 049 0008	ELECT	1U M	50V
C257	403 215 2201	CERAMIC	0.01U K	50V

Schematic Location	Part No.	Description		
C258	403 044 1703	ELEC	470U M	16V
C272	403 050 6600	ELECT	3.3U M	50V
C274	403 041 8804	ELECT	10U M	16V
C284	403 043 9106	ELECT	47U M	16V
C285	403 215 2201	CERAMIC	0.01U K	50V
C401	403 043 1902	ELECT	2200U M	16V
C402	403 215 2201	CERAMIC	0.01U K	50V
C403	404 086 6800	POLYESTER	6800P J	63V
	403 063 0008	POLYESTER	6800P K	50V
	403 063 0206	POLYESTER	6800P K	50V
	403 179 0305	POLYESTER	6800P K	50V
C404	403 157 3601	CERAMIC	100P J	50V
C405	403 086 2300	NP-ELECT	1U M	50V
C406	403 076 3607	CERAMIC	470P K	500V
C407	403 075 9204	CERAMIC	1500P K	500V
C408	403 055 0504	ELECT	1U M	160V
★C411	404 077 4402	MT-POLYPRO	7200P H	1.5K
	403 343 7901	MT-POLYPRO	7200P H	1.5K
★C416	404 081 2401	MT-POLYPRO	0.22U M	200V
	403 078 9805	MT-POLYPRO	0.22U J	200V
	403 346 6901	MT-POLYPRO	0.22U J	250V
	403 372 6609	MT-POLYPRO	0.22U J	250V
C421	403 038 6301	ELECT	220U M	6.3V
C427	403 215 2201	CERAMIC	0.01U K	50V
C441	403 215 2201	CERAMIC	0.01U K	50V
C471	403 044 1703	ELECT	470U M	16V
C473	404 084 5706	MT-POLYEST	47U J	63V
	403 166 7706	MT-POLYEST	0.47U J	63V
	403 067 7805	MT-COMPO	0.47U J	50V
	403 256 0808	MT-COMPO	0.47U J	50V
C482	403 115 0802	ELECT	22U M	100V
C484	403 051 0607	ELECT	4.7U M	50V
C487	403 052 8503	ELECT	1000U M	35V
C489	403 043 0202	ELECT	220U M	16V
C493	404 056 5307	NP-ELECT	2.2U M	100V
	404 045 6605	NP-ELECT	2.2U M	50V
C497	403 038 1603	ELECT	100U M	6.3V
C502	403 053 2104	ELECT	220U M	35V
C503	403 049 9803	ELECT	2.2U M	50V
C504	403 045 9807	ELECT	2200U M	25V
C505	404 084 5706	MT-POLYEST	0.47U J	63V
	403 166 7706	MT-POLYEST	0.47U J	63V
	403 067 7805	MT-COMPO	0.47U J	50V
	403 256 0808	MT-COMPO	0.47U J	50V
C506	403 062 5103	POLYESTER	5600P K	50V
	403 062 5301	POLYESTER	5600P K	50V
	403 179 0701	POLYESTER	5600P K	50V
C508	403 157 3106	CERAMIC	56P J	50V
C509	404 084 5706	MT-POLYEST	0.47U J	63V
	403 166 7706	MT-POLYEST	0.47U J	63V
	403 067 7805	MT-COMPO	0.47U J	50V
	403 256 0808	MT-COMPO	0.47U J	50V
C510	403 215 2201	CERAMIC	0.01U K	50V
★C511	403 260 2300	MT-COMPO	0.15U J	50V
C516	403 041 8804	ELECT	10U M	16V
★C601	404 071 2404	MT-POLYEST	0.22U K	250V
	404 066 2204	MT-POLYEST	0.22U M	275V
	404 088 8802	MT-POLYEST	0.22U M	275V
C603	403 075 7101	CERAMIC	1000P K	500V

Schematic Location	Part No.	Description		
C604	403 075 7101	CERAMIC	1000P K	500V
C606	404 088 2909	CERAMIC	1000P M	250V
	404 088 7102	CERAMIC	1000P M	250V
C 608	403 222 1907	CERAMIC	2200P K	1K
	403 263 6305	CERAMIC	2200P K	1K
C609	404 075 5005	ELECT	470U M	200V
	404 089 3509	ELECT	470U M	200V
C612	404 084 5102	POLYESTER	0.1U K	63V
	403 057 2803	POLYESTER	0.1U K	50V
	403 057 3107	POLYESTER	0.1U K	50V
	403 181 8207	POLYESTER	0.1U K	50V
C613	404 086 6503	POLYESTER	0.047U J	63V
	403 062 0306	POLYESTER	0.047U K	50V
	403 062 0504	POLYESTER	0.047U K	50V
	403 179 0909	POLYESTER	0.047U K	50V
C614	404 084 5003	POLYESTER	0.01U J	63V
	403 057 0403	POLYESTER	0.01U K	50V
	403 057 0601	POLYESTER	0.01U K	50V
	403 179 3801	POLYESTER	0.01U K	50V
★C625	403 266 4902	CERAMIC	1200P K	1K
C626	403 042 4805	ELECT	1000U M	16V
C628	404 052 9309	ELECT	220U M	160V
C629	403 043 0202	ELECT	220U M	16V
★C631	404 088 2909	CERAMIC	1000P M	250V
	404 088 7102	CERAMIC	1000P M	250V
★C632	404 088 2909	CERAMIC	1000P M	250V
	404 088 7102	CERAMIC	1000P M	250V
C634	403 043 9106	ELECT	47U M	16V
C683	403 043 0202	ELECT	220U M	16V
C689	403 305 3507	CERAMIC	0.1U Z	50V
C693	403 047 8402	ELECT	0.1U M	50V
C701	403 146 0505	CERAMIC	1200P K	50V
C711	403 113 3805	CERAMIC	1000P K	50V
C721	403 113 3805	CERAMIC	1000P K	50V
★C742	403 077 2807	CERAMIC	1000P Z	2K
C801	403 215 2201	CERAMIC	0.01U K	50V
C806	403 039 3507	ELECT	470U M	6.3V
C809	403 157 3601	CERAMIC	100P J	50V
C810	403 157 3601	CERAMIC	100P J	50V
C811	403 049 0008	ELECT	1U M	50V
C822	403 042 7707	ELECT	22U M	16V
C829	403 049 0008	ELECT	1U M	50V
C835	403 215 2201	CERAMIC	0.01U K	50V
C841	403 305 3507	CERAMIC	0.1U Z	50V
C842	403 305 3507	CERAMIC	0.1U Z	50V
C843	403 305 3507	CERAMIC	0.1U Z	50V
C853	403 047 8402	ELECT	0.1U M	50V
C854	403 153 9300	CERAMIC	82P J	50V
C856	403 049 0008	ELECT	1U M	50V
C857	403 157 4202	CERAMIC	220P J	50V
C858	403 113 3805	CERAMIC	1000P K	50V
C862	403 215 2201	CERAMIC	0.01U K	50V
C1001	403 041 8804	ELECT	10U M	16V
C1002	403 041 8804	ELECT	10U M	16V
C1051	403 042 7707	ELECT	22U M	16V
C1052	403 215 2201	CERAMIC	0.01U K	50V
C1059	403 041 8804	ELECT	10U M	16V
C1071	403 215 2201	CERAMIC	0.01U K	50V
C1080	403 305 3507	CERAMIC	0.1U Z	50V

Schematic Location	Part No.	Description		
C1081	403 041 8804	ELECT	10U M	16V
C1902	403 041 8804	ELECT	10U M	16V
C3401	403 047 8402	ELECT	0.1U M	50V
C3404	403 086 0108	NP-ELECT	4.7U M	25V
C3406	403 215 2300	CERAMIC	0.012U K	50V
C3407	403 155 2408	CERAMIC	5600P K	50V
C3408	403 048 6308	ELECT	0.47U M	50V
C3411	403 048 6308	ELECT	0.47U M	50V
C3412	403 043 9106	ELECT	47U M	16V
C3413	403 051 0607	ELECT	4.7U M	50V
C3414	403 042 2405	ELECT	100U M	16V
C3416	403 086 0108	NP-ELECT	4.7U M	25V
C3417	403 051 0607	ELECT	4.7U M	50V
C3418	403 086 0108	NP-ELECT	4.7U M	25V
C3421	403 157 7104	CERAMIC	2700P K	50V
C3422	403 356 5109	CERAMIC	0.047U K	50V
C3423	403 380 0002	TA-SOLID	3.3U K	10V
C3424	403 086 0108	NP-ELECT	4.7U M	25V
C3426	403 379 9900	TA-SOLID	10U K	10V
C3427	403 049 0008	ELECT	1U M	50V
C3431	403 155 2309	CERAMIC	4700P K	50V
C3432	403 047 8402	ELECT	0.1U M	50V
C3433	403 155 2309	CERAMIC	4700P K	50V
C3434	403 284 4304	CERAMIC	0.022U K	50V
C3436	403 086 0108	NP-ELECT	4.7U M	25V
C3439	403 086 0108	NP-ELECT	4.7U M	25V
C3441	403 051 0607	ELECT	4.7U M	50V
C3442	403 051 0607	ELECT	4.7U M	50V
C3447	403 051 0607	ELECT	4.7U M	50V
C3448	403 051 0607	ELECT	4.7U M	50V
	DIODE			
D001	407 099 7000	ZENER DIODE MTZJ15B		
	407 054 5805	ZENER DIODE RD15EB2		
	408 047 4706	ZENER DIODE MTZJ15B		
D101	407 100 0204	ZENER DIODE MTZJ36A		
	407 056 2307	ZENER DIODE RD36EB1		
	408 047 6205	ZENER DIODE MTZJ36A		
D351	407 063 8606	ZENER DIODE MTZJ5.1A		
	407 056 7906	ZENER DIODE RD5.1EB1		
	408 047 6502	ZENER DIODE MTZJ5.1A		
D408	407 222 4401	ZENER DIODE 1Z150		
★D421	407 158 1307	ZENER DIODE HZ11B2L		
★D422	407 158 1307	ZENER DIODE HZ11B2L		
D428	407 099 7109	ZENER DIODE MTZJ15C		
	407 054 5904	ZENER DIODE RD15EB3		
D429	408 008 2406	DIODE 1N4148		
	407 013 4306	DIODE 1S2076A		
	407 013 7109	DIODE 1S2473		
D471	407 006 4108	DIODE ERB44-04		
	407 007 7603	DIODE EU2		
D481	407 124 6404	DIODE ERA18-04		
	407 007 6606	DIODE ES1		
	407 124 5506	DIODE RMPG06G		
D482	407 011 4407	DIODE TVR1G		
D483	407 124 6404	DIODE ERA18-04		
	407 007 6606	DIODE ES1		
	407 124 5506	DIODE RMPG06G		

Schematic Location	Part No.	Description
D486	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D487	407 005 7308	DIODE EM01Z
	407 005 8602	DIODE ERA15-02
	407 088 6502	DIODE MPG06D
	407 011 3004	DIODE S5277B
	408 009 9404	DIODE 1N4002ID
D490	407 063 8903	ZENER DIODE MTZJ5.6C
	407 057 0104	ZENER DIODE RD5.6EB3
	408 047 7707	ZENER DIODE MTZJ5.6C
D501	407 005 7308	DIODE EM01Z
	407 005 8602	DIODE ERA15-02
	407 088 6502	DIODE MPG06D
	407 011 3004	DIODE S5277B
	408 009 9404	DIODE 1N4002ID
D502	407 118 2207	ZENER DIODE 1Z75
D503	407 100 0303	ZENER DIODE MTZJ36B
	407 056 2406	ZENER DIODE RD36EB2
	408 047 6205	ZENER DIODE MTZJ36A
★D601	407 005 7605	DIODE EM2B
	408 008 8606	DIODE GP15G
	407 013 3200	DIODE 1S1887A
★D602	407 005 7605	DIODE EM2B
	408 008 8606	DIODE GP15G
	407 013 3200	DIODE 1S1887A
★D603	407 005 7605	DIODE EM2B
	408 008 8606	DIODE GP15G
	407 013 3200	DIODE 1S1887A
★D604	407 005 7605	DIODE EM2B
	408 008 8606	DIODE GP15G
	407 013 3200	DIODE 1S1887A
D611	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
★D612	407 147 5705	PHOTO COUPLE ON3131S
	407 104 2402	PHOTO COUPLE PC817C
	407 106 6101	PHOTO COUPLE PC817D
	407 175 9904	PHOTO COUPLE TLP621-1-BL
D613	407 063 9702	ZENER DIODE MTZJ9.1C
	407 057 9800	ZENER DIODE RD9.1EB3
D614	407 006 0100	DIODE ERA91-02
★D624	407 106 2806	DIODE RU3YX
★D625	407 211 5808	DIODE FE201-6L43
	407 129 7000	DIODE RU4AM LF-L1
D627	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D629	407 099 7208	ZENER DIODE MTZJ16A
	407 054 7007	ZENER DIODE RD16EB1
D680	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D683	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D693	407 099 5501	ZENER DIODE MTZJ6.2C
	407 057 2801	ZENER DIODE RD6.2EB3
D801	408 008 2406	DIODE 1N4148

Schematic Location	Part No.	Description
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D831	407 222 5903	ZD UDZS3.6B-TE-17
D834	407 099 7109	ZENER DIODE MTZJ15C
	407 054 5904	ZENER DIODE RD15EB3
	408 047 4706	ZENER DIODE MTZJ15B
D836	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D843	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D1001	07 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D1002	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D1051	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D1052	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
D1059	407 206 5608	ZENER DIODE UDZS-TE-1710B
D1901	407 099 5600	ZENER DIODE MTZJ6.8A
	407 057 4003	ZENER DIODE RD6.8EB1
	408 047 8605	ZENER DIODE MTZJ6.8A
D1902	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
	408 047 2306	ZENER DIODE MTZJ10B-52
	INTEGRATED CIRCUITS	
IC001	409 275 7903	IC LA4525
★IC101	409 491 4809	IC LA76834NM-TBM
★IC501	409 449 4103	IC LA78040
★IC601	409 172 8102	IC SE130NH
IC681	409 241 8309	IC TA78L05S
	409 066 7303	IC UPC78L05J
IC801	410 418 8602	IC M37272M6-542FP T4
IC802	409 495 6908	IC CAT24WC02P
	409 440 8902	IC M24C02-BN6
	409 376 1503	IC ST24C02B6
	409 528 8404	IC S524A40X21-DCB0
	409 497 0706	IC S524C20D21-DCB0
	409 333 3700	IC 24LC02B/P
IC1081	409 051 3006	IC TC4053BP
IC3401	409 467 1108	IC CXA2134Q-T6
	COIL	
★LF601	645 012 0589	LINE FILTER
	645 042 7510	LINE FILTER
	645 052 6862	LINE FILTER
L164	645 003 9713	INDUCTOR,15U K
	645 016 2657	INDUCTOR,15U K
L401	645 036 4198	INDUCTOR,1.0U,FILTER
L404	645 003 9676	INDUCTOR,100U K
	645 016 2565	INDUCTOR,100U K
L413	645 036 7441	COIL,LINEARITY

Schematic Location	Part No.	Description
L602	645 005 0763	CORE,PIPE
L623	652 000 1725	CORE PIPE
L625	652 000 1725	CORE PIPE
L801	645 008 2894	INDUCTOR,5.6U K
	645 016 3098	INDUCTOR,5.6U K
L811	645 006 2490	INDUCTOR,1U K
	645 016 2404	INDUCTOR,1U K
L812	645 006 2490	INDUCTOR,1U K
	645 016 2404	INDUCTOR,1U K
L821	645 008 2894	INDUCTOR,5.6U K
	645 016 3098	INDUCTOR,5.6U K
L851	645 008 2894	INDUCTOR,5.6U K
	645 016 3098	INDUCTOR,5.6U K
★L901	645 059 7763	COIL,DEGAUSSING
L1901	645 008 2894	INDUCTOR,5.6U K
	645 016 3104	INDUCTOR,5.6U K
	TRANSISTOR	
Q001	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 157 0505	TR 2SC536NF-NPA
	405 151 8705	TR 2SC536NG-NPA
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q005	405 008 4805	TR 2SB764-E
	405 008 4904	TR 2SB764-F
Q135	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 157 0505	TR 2SC536NF-NPA
	405 151 8705	TR 2SC536NG-NPA
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q202	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 151 3304	TR 2SA608NF-NPA
	405 006 1707	TR 2SA933S-Q
	05 006 1806	TR 2SA933S-R
Q208	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 151 3304	TR 2SA608NF-NPA
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q401	405 029 7106	TR 2SC2271-D

Schematic Location	Part No.	Description
	405 013 6207	TR 2SC2271-D-CTV
	405 029 7205	TR 2SC2271-E
	405 013 6306	TR 2SC2271-E-CTV
★Q402	405 157 1304	TR 2SD2634-YB
Q486	405 023 5009	TR 2SD400-E-MP
	405 023 5306	TR 2SD400-F-MP
Q490	405 023 5009	TR 2SD400-E-MP
	405 023 5306	TR 2SD400-F-MP
★Q601	405 166 7601	TR 2SK2872
Q611	405 013 6801	TR 2SC2274-E
	405 013 7006	TR 2SC2274-F
Q612	405 006 6504	TR 2SA984-E
	405 006 6702	TR 2SA984-F
Q613	405 013 6801	TR 2SC2274-E
	405 013 7006	TR 2SC2274-F
Q627	405 089 0000	TR 2SA1707-S
	405 089 0109	TR 2SA1707-T
	405 009 6907	TR 2SB985-S
	405 009 7003	TR 2SB985-T
Q635	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 157 0505	TR 2SC536NF-NPA
	405 151 8705	TR 2SC536NG-NPA
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q681	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 157 0505	TR 2SC536NF-NPA
	405 151 8705	TR 2SC536NG-NPA
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q693	405 011 8401	TR 2SC1740S-Q
	405 011 8500	TR 2SC1740S-R
	405 011 8609	TR 2SC1740S-S
	405 012 2002	TR 2SC1815-GR
	405 012 2101	TR 2SC1815-O
	405 012 2309	TR 2SC1815-Y
	405 157 0505	TR 2SC536NF-NPA
	405 151 8705	TR 2SC536NG-NPA
	405 020 7501	TR 2SC945A-PA
	405 020 7709	TR 2SC945A-QA
	405 020 7907	TR 2SC945A-RA
Q695	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3208	TR 2SA564A-R(CU)
	405 004 4809	TR 2SA608-F-CTV-NP
	405 151 3304	TR 2SA608NF-NPA
Q701	406 000 3605	TR 2SC3620(LB-SAN-1)
	405 066 4304	TR 2SC2621-C-RA

Schematic Location	Part No.	Description
	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q711	406 000 3605	TR 2SC3620(LB-SAN-1)
	405 066 4304	TR 2SC2621-C-RA
	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q721	406 000 3605	TR 2SC3620(LB-SAN-1)
	405 066 4304	TR 2SC2621-C-RA
	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
Q831	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
	405 173 9605	TR 2SA1235A1E
	405 173 9704	TR 2SA1235A1F
Q1071	406 000 6804	TR 2SA1015-G(SAN)-TPE2
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 151 3304	TR 2SA608NF-NPA
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R

RESISTORS

NOTES:
Read description of the Resistor as follows:

(Example)
CARBON 4.7K J A 1/4W

- 1/4W — Rated Wattage
- A — Performance Symbols:
  A..General B...Non-flammable
  Z...Low noise
  Other...Temperature coefficient
- J — Tolerance Symbols:
  A...0.05% B...0.1% C...0.25%
  D...0.5% F...1% G...2%
  J...5% K...10% M...20%
  P...+5 -15%
- 4.7K — Rated Value, ohms:
  K...1,000 M...1,000,000
- CARBON — Material:
  CARBON . . . . .Carbon
  MT-FILM . . . . .Metal Film
  OXIDE-MT . . . . . . .Oxide Metal Film
  SOLID . . . . .Composition
  MT-GLAZE . . . . . .Metal Glaze
  WIRE WOUND . . .Wire Wound
  CERAMIC RES . . .Ceramic
  FUSIBLE RES . . . .Fusible

Schematic Location	Part No.	Description	
R001	401 105 1105	MT-GLAZE	12K JA 1/16W
R002	401 105 1105	MT-GLAZE	12K JA 1/16W
R003	401 105 0504	MT-GLAZE	1K JA 1/16W
R004	401 105 0504	MT-GLAZE	1K JA 1/16W
R005	401 105 0603	MT-GLAZE	10K JA 1/16W
R006	401 014 4105	CARBON	1.5K JA 1/4W
R013	401 027 2600	CARBON	5.6K JA 1/6W
★R106	401 008 2001	CARBON	18K JA 1/2W
R107	401 023 2802	CARBON	8.2K JA 1/4W
R131	401 105 4205	MT-GLAZE	33K JA 1/16W
R133	401 105 3703	MT-GLAZE	3K JA 1/16W
R135	401 105 7909	MT-GLAZE	0.000 ZA 1/16W
R137	401 105 0504	MT-GLAZE	1K JA 1/16W
R142	401 105 4205	MT-GLAZE	33K JA 1/16W
R143	401 105 0504	MT-GLAZE	1K JA 1/16W
R151	401 105 4007	MT-GLAZE	330 JA 1/16W
R161	401 105 0702	MT-GLAZE	100K JA 1/16W
R162	401 105 0702	MT-GLAZE	100K JA 1/16W
R163	401 105 0900	MT-GLAZE	120 JA 1/16W
R164	401 105 0504	MT-GLAZE	1K JA 1/16W
R166	401 105 4502	MT-GLAZE	390 JA 1/16W
R167	401 105 1907	MT-GLAZE	180 JA 1/16W
R201	401 026 9600	CARBON	470 JA 1/6W
R208	401 105 0504	MT-GLAZE	1K JA 1/16W
R209	401 105 0405	MT-GLAZE	100 JA 1/16W
R212	401 105 6704	MT-GLAZE	680K JA 1/16W
R251	401 105 2904	MT-GLAZE	22K JA 1/16W
R252	401 025 8208	CARBON	22K JA 1/6W
R272	401 105 6605	MT-GLAZE	6.8K JA 1/16W
R273	401 105 0603	MT-GLAZE	10K JA 1/16W
R274	401 105 6001	MT-GLAZE	5.6K JA 1/16W
R276	401 024 9701	CARBON	12K JA 1/6W
R281	401 105 0603	MT-GLAZE	10K JA 1/16W
R284	401 026 9303	CARBON	47 JA 1/6W
R287	401 105 0405	MT-GLAZE	100 JA 1/16W
R288	401 105 0405	MT-GLAZE	100 JA 1/16W
R289	401 105 0405	MT-GLAZE	100 JA 1/16W
R321	401 105 0603	MT-GLAZE	10K JA 1/16W
R353	401 024 7400	CARBON	10K JA 1/6W
R400	401 024 6700	CARBON	100 JA 1/6W
★R401	401 012 4503	CARBON	100 JA 1/4W
★R402	401 013 4205	CARBON	120 JA 1/4W
R404	401 026 9303	CARBON	47 JA 1/6W
R405	401 105 6001	MT-GLAZE	5.6K JA 1/16W
R406	401 011 6102	CARBON	8.2K JA 1/2W
★R407	401 069 8202	OXIDE-MT	8.2K JA 2W
★R411A	402 068 5001	WIRE WOUND	6.8 KA 7W
	402 076 0401	WIRE WOUND	6.8 KA 7W
R413	401 058 3706	OXIDE-MT	1K JA 1W
R416	401 026 3707	CARBON	33 JA 1/6W
★R421	401 053 1202	MT-FILM	2.2K FA 1/6W
★R422	401 052 6802	MT-FILM	10K FA 1/6W
★R423	401 217 3905	MT-GLAZE	3.3K FA 1/16W
R426	401 105 6506	MT-GLAZE	680 JA 1/16W
R428	401 025 1902	CARBON	15K JA 1/6W
R430	401 024 7004	CARBON	1K JA 1/6W
R441	401 024 7004	CARBON	1K JA 1/6W
R442	401 105 0603	MT-GLAZE	10K JA 1/16W
R443	401 026 9907	CARBON	4.7K JA 1/6W
R444	401 025 4606	CARBON	18K JA 1/6W
R449	401 203 9904	MT-GLAZE	4.7K FA 1/16W
★R471	401 006 7701	CARBON	1 JB 1/2W
★R472	401 069 5607	OXIDE-MT	8.2 JA 2W
★R481	401 010 2600	CARBON	47 JB 1/2W
★R482	401 011 9004	CARBON	1 JB 1/4W
★R483	401 006 7701	CARBON	1 JB 1/2W
R485	401 025 4606	CARBON	18K JA 1/6W
★R486	401 069 5607	OXIDE-MT	8.2 JA 2W
R487	401 026 6609	CARBON	390 JA 1/6W
★R488	401 059 1602	OXIDE-MT	15 JA 1W
★R489	401 066 5204	OXIDE-MT	22 JA 2W
R491	401 012 5708	CARBON	1K JA 1/4W
R492	401 156 8504	MT-FILM	33K FA 1/6W
R493	401 019 4001	CARBON	390K JA 1/4W
R494	401 018 5801	CARBON	330K JA 1/4W
★R495	401 061 1706	OXIDE-MT	33 JA 1W
★R497	401 068 1501	OXIDE-MT	4.7 JA 2W
R499	401 026 6609	CARBON	390 JA 1/6W
R503	401 026 7002	CARBON	3.9K JA 1/6W
R504	401 027 2600	CARBON	5.6K JA 1/6W
R505	401 006 8104	CARBON	1.2 JA 1/2W
R506	401 027 8305	CARBON	820 JA 1/6W
R507	401 006 7602	CARBON	1 JA 1/2W
R508	401 024 9701	CARBON	12K JA 1/6W
R509	401 027 5502	CARBON	6.8K JA 1/6W
★R511	401 065 2808	OXIDE-MT	120 JA 2W
R517	401 025 4606	CARBON	18K JA 1/6W
R518	401 105 2102	MT-GLAZE	18K JA 1/16W
★R601	402 083 6106	WIRE WOUND	1 KA 7W

Schematic Location	Part No.	Description
★R602	402 000 1603	SOLID 3.3M MA 1/2W
	402 088 1502	RESISTER 3.3M JA 1/2W
R603	401 010 9203	CARBON 560K JA 1/2W
★R604	401 066 3002	OXIDE-MT 2.2 JA 2W
R606	401 019 9709	CARBON 47 JB 1/4W
R607	401 016 1508	CARBON 22 JA 1/4W
R608	401 105 5509	MT-GLAZE 470K JA 1/16W
R609	401 105 2904	MT-GLAZE 22K JA 1/16W
R611	401 027 0309	CARBON 47K JA 1/6W
★R612	402 001 8502	FUSIBLE RES 10 J- 1/2W
★R613	401 180 8402	OXIDE-MT 0.47 JA 2W
R614	401 020 0900	CARBON 470 JB 1/4W
★R615	401 180 8402	OXIDE-MT 0.47 JA 2W
R616	401 105 0603	MT-GLAZE 10K JA 1/16W
R617	402 001 8106	FUSIBLE RES 680 J- 1/4W
R618	401 012 5807	CARBON 1K JB 1/4W
R619	401 105 2904	MT-GLAZE 22K JA 1/16W
R627	401 105 0603	MT-GLAZE 10K JA 1/16W
R628	401 013 5301	CARBON 1.2K JA 1/4W
R629	401 105 0504	MT-GLAZE 1K JA 1/16W
★R630	401 060 5002	OXIDE-MT 22K JA 1W
R631	401 022 3107	CARBON 6.8K JA 1/4W
R632	401 105 0504	MT-GLAZE 1K JA 1/16W
R634	401 027 0309	CARBON 47K JA 1/6W
R683	401 026 9907	CARBON 4.7K JA 1/6W
R691	401 105 0603	MT-GLAZE 10K JA 1/16W
R692	401 027 5908	CARBON 68K JA 1/6W
R693	401 105 6100	MT-GLAZE 560K JA 1/16W
R694	401 024 7400	CARBON 10K JA 1/6W
R695	401 105 2904	MT-GLAZE 22K JA 1/16W
R701	401 025 3807	CARBON 180 JA 1/6W
R703	401 105 7305	MT-GLAZE 820 JA 1/16W
R704	401 027 8107	CARBON 82 JA 1/6W
R706	401 009 1508	CARBON 2.7K JA 1/2W
R707	401 065 4604	OXIDE-MT 12K JA 2W
R711	401 025 3807	CARBON 180 JA 1/6W
R713	401 105 7305	MT-GLAZE 820 JA 1/16W
R714	401 105 7206	MT-GLAZE 82 JA 1/16W
R716	401 009 1508	CARBON 2.7K JA 1/2W
★R717	401 065 4604	OXIDE-MT 12K JA 2W
R721	401 025 3807	CARBON 180 JA 1/6W
R723	401 105 7305	MT-GLAZE 820 JA 1/16W
R724	401 027 8107	CARBON 82 JA 1/6W
R726	401 009 1508	CARBON 2.7K JA 1/2W
★R727	401 065 4604	OXIDE-MT 12K JA 2W
R803	401 024 6700	CARBON 100 JA 1/6W
R804	401 024 6700	ARBON 100 JA 1/6W
R806	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R807	401 105 0603	MT-GLAZE 10K JA 1/16W
R808	401 105 0603	MT-GLAZE 10K JA 1/16W
R809	401 105 5301	MT-GLAZE 4.7K JA 1/16W
R810	401 105 2904	MT-GLAZE 22K JA 1/16W
R813	401 105 0603	MT-GLAZE 10K JA 1/16W
R814	401 105 0603	MT-GLAZE 10K JA 1/16W
R816	401 105 4007	MT-GLAZE 330 JA 1/16W
R823	401 024 6700	CARBON 100 JA 1/6W
R829	401 024 6700	CARBON 100 JA 1/6W
R831	401 105 0702	MT-GLAZE 100K JA 1/16W
R833	401 024 7400	CARBON 10K JA 1/6W

Schematic Location	Part No.	Description
R835	401 105 3307	MT-GLAZE 2.7K JA 1/16W
R842	401 105 5905	MT-GLAZE 560 JA 1/16W
R843	401 105 5905	MT-GLAZE 560 JA 1/16W
R844	401 105 5905	MT-GLAZE 560 JA 1/16W
R846	401 024 7004	CARBON 1K JA 1/6W
R847	401 027 2600	CARBON 5.6K JA 1/6W
R848	401 027 2600	CARBON 5.6K JA 1/6W
R849	401 027 2600	CARBON 5.6K JA 1/6W
R851	401 105 0504	MT-GLAZE 1K JA 1/16W
R852	401 105 4700	MT-GLAZE 39K JA 1/16W
R853	401 105 8005	MT-GLAZE 1M JA 1/16W
R854	401 105 2805	MT-GLAZE 2.2K JA 1/16W
R856	401 024 6700	CARBON 100 JA 1/6W
R857	401 024 6700	CARBON 100 JA 1/6W
R858	401 105 2904	MT-GLAZE 22K JA 1/16W
R862	401 105 0405	MT-GLAZE 100 JA 1/16W
R864	401 105 1204	MT-GLAZE 120K JA 1/16W
R881	401 105 0405	MT-GLAZE 100 JA 1/16W
R882	401 105 0405	MT-GLAZE 100 JA 1/16W
R883	401 024 6700	CARBON 100 JA 1/6W
R884	401 024 6700	CARBON 100 JA 1/6W
R886	401 105 0603	MT-GLAZE 10K JA 1/16W
R1001	401 113 4402	MT-GLAZE 75 JA 1/16W
R1002	401 113 4402	MT-GLAZE 75 JA 1/16W
R1003	401 105 0603	MT-GLAZE 10K JA 1/16W
R1004	401 105 3406	MT-GLAZE 27K JA 1/16W
R1006	401 105 0603	MT-GLAZE 10K JA 1/16W
R1007	401 105 3406	MT-GLAZE 27K JA 1/16W
R1051	401 113 4402	MT-GLAZE 75 JA 1/16W
R1052	401 113 4402	MT-GLAZE 75 JA 1/16W
R1053	401 024 7400	CARBON 10K JA 1/6W
R1054	401 026 1307	CARBON 27K JA 1/6W
R1059	401 024 7004	CARBON 1K JA 1/6W
R1071	401 026 6609	CARBON 390 JA 1/6W
R1073	401 024 6700	CARBON 100 JA 1/6W
R1081	401 105 2904	MT-GLAZE 22K JA 1/16W
R1082	401 105 2904	MT-GLAZE 22K JA 1/16W
R1083	401 105 3406	MT-GLAZE 27K JA 1/16W
R1084	401 105 0603	MT-GLAZE 10K JA 1/16W
R1901	401 105 0603	MT-GLAZE 10K JA 1/16W
R1902	401 105 0504	MT-GLAZE 1K JA 1/16W
R1903	401 025 4200	ARBON 1.8K JA 1/6W
R1904	401 105 7909	MT-GLAZE 0.000 ZA 1/16W
R1905	401 105 2805	MT-GLAZE 2.2K JA 1/16W
R1906	401 105 4601	MT-GLAZE 3.9K JA 1/16W
R1907	401 105 6001	MT-GLAZE 5.6K JA 1/16W
R1908	401 105 1105	MT-GLAZE 12K JA 1/16W
R1909	401 024 7004	CARBON 1K JA 1/6W
R1910	401 024 7004	CARBON 1K JA 1/6W
R3401	401 105 2706	MT-GLAZE 220 JA 1/16W
R3402	401 105 2706	MT-GLAZE 220 JA 1/16W
R3406	401 105 0702	MT-GLAZE 100K JA 1/16W
R3407	401 105 8005	MT-GLAZE 1M JA 1/16W
R3411	401 236 4303	MT-GLAZE 62K FA 1/16W
R3421	401 105 4106	MT-GLAZE 3.3K JA 1/16W
R3422	401 105 3703	MT-GLAZE 3K JA 1/16W
R3426	401 105 4601	MT-GLAZE 3.9K JA 1/16W
R3441	401 105 4304	MT-GLAZE 330K JA 1/16W
R3442	401 105 0405	MT-GLAZE 100 JA 1/16W

Schematic Location	Part No.	Description
R3443	401 105 4304	MT-GLAZE 330K JA 1/16W
R3444	401 105 0405	MT-GLAZE 100 JA 1/16W
R3445	401 105 4304	MT-GLAZE 330K JA 1/16W
R3446	401 105 0405	MT-GLAZE 100 JA 1/16W
R3447	401 105 4304	MT-GLAZE 330K JA 1/16W
R3448	401 105 0405	MT-GLAZE 100 JA 1/16W

SWITCHES

Schematic Location	Part No.	Description
SW1901	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1903	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1904	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1905	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1906	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1907	645 003 4701	SWITCH,PUSH 1P-1TX1
	645 019 4887	SWITCH,PUSH 1P-1TX1
	645 027 7382	SWITCH,PUSH 1P-1TX1

TRANSFORMER

Schematic Location	Part No.	Description
T151	645 049 3775	TRANS,OSC 45.75MHZ
T401	652 000 1442	TRANS,DRIVE
★T402	645 060 1224	TRANS,FLYBACK
★T601	645 051 2384	TRANS,POWER,PULSE
	645 051 4951	TRANS,POWER,PULSE

CRYSTAL/FILTERS

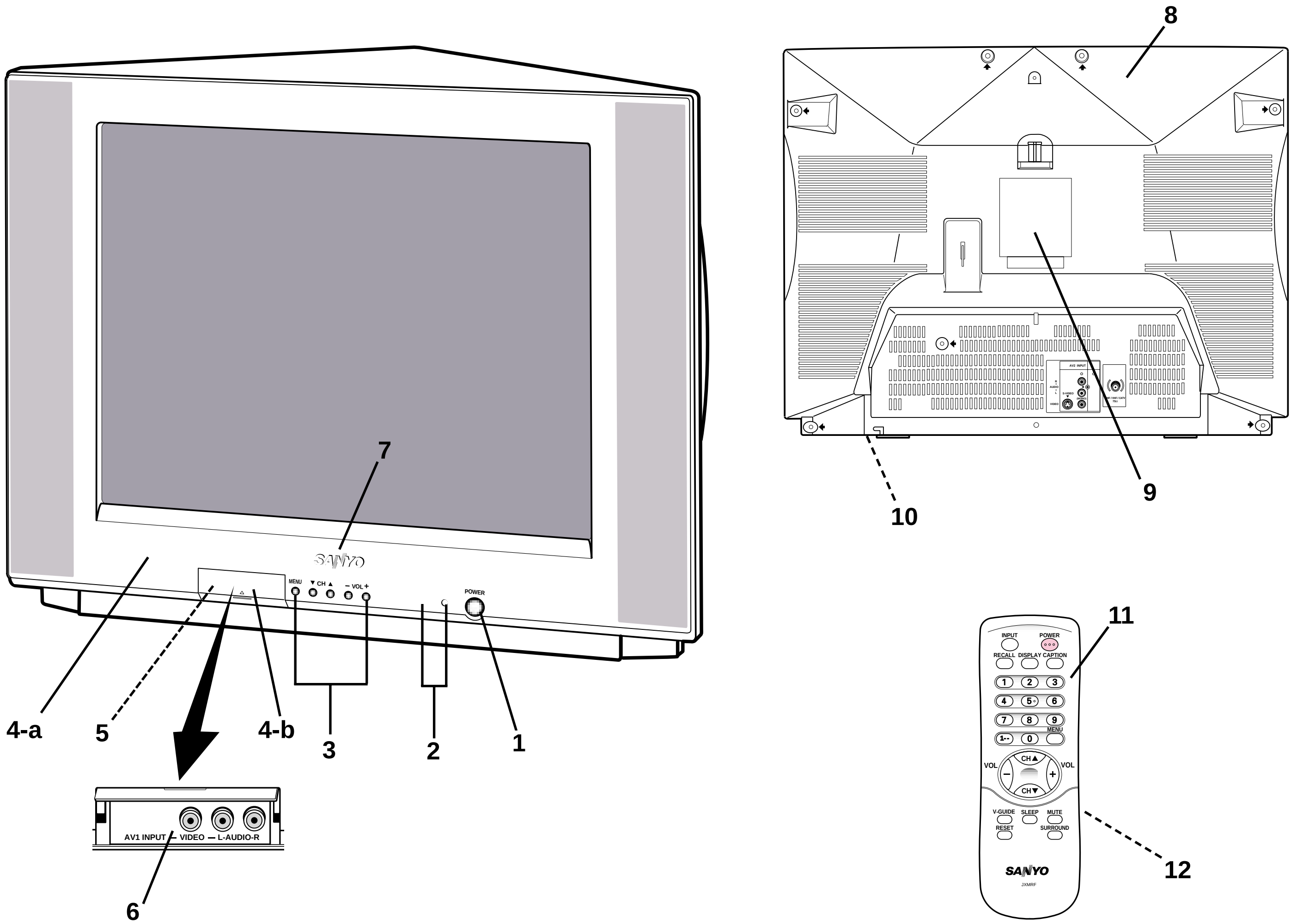
Schematic Location	Part No.	Description
X141	421 008 9008	SAW F TSF5235P
X161	610 015 2991	TRAP,CERAMIC 4.5MHZ
	610 015 3059	TRAP,CERAMIC 4.5MHZ
	645 041 1618	TRAP CERAMIC 4.5 MHZ
X251	610 204 4195	CRYSTAL OSCILLATOR
	610 245 9746	CRYSTAL OSCILLATOR
	610 012 0655	CRYSTAL OSCILLATOR
	645 050 4464	OSC,CRYSTAL 3.58MHZ
X801	645 000 6692	OSC,CERAMIC 8.00MHZ
	645 021 5483	OSC,CERAMIC 8.00MHZ

MISCELLANEOUS

Schematic Location	Part No.	Description
A100	610 306 8190	ASSY,PWB,MAIN C3RK
★A101	645 053 7936	TUNER,U/V
	645 052 6077	TUNER,U/V
	645 052 6084	TUNER,U/V
A200	610 306 8213	ASSY,PWB,CTV C3RK
A700	610 306 8206	ASSY,PWB,CRT C3RK
A1901	645 047 6228	UNIT,REMOCON RECEIVER
★F601	423 029 8008	FUSE 125V 4A
	423 018 8101	FUSE 125V 4A
	423 007 1601	FUSE 125V 4A
	423 007 1809	FUSE 125V 4A
F601A	645 040 3576	HOLDER,FUSE

Schematic Location	Part No.	Description
F601B	645 040 3576	HOLDER,FUSE
★K701	645 040 0056	SOCKET,CRT 9P
K1001	645 006 3787	JACK,RCA-3
K1011	645 054 9885	JACK,RCA-3
K1051	645 007 1584	SOCKET,DIN 4P
★PS601	408 046 5209	TH PTDAA1BF3R0Q100
★Q901	414 012 1601	CRT ASSY A51QDX992X003
Q901A	645 008 8674	MAGNET,CG.PR
	610 003 1739	CG PURITY MAGNET
Q901B1	610 233 7891	DY SPACER E2HA
	610 290 4154	DY SPACER-F8LZ
Q901B2	610 233 7891	DY SPACER E2HA
	610 290 4154	DY SPACER-F8LZ
Q901B3	610 233 7891	DY SPACER E2HA
	610 290 4154	DY SPACER-F8LZ
★RL601	645 000 4155	RELAY
	645 011 2713	RELAY
	645 024 7828	RELAY
	645 015 8629	RELAY
	645 024 7767	RELAY
	645 052 5933	RELAY
SP901	652 001 0888	SPEAKER,8
SP902	652 001 0888	SPEAKER,8
★W601	645 059 5370	CORD,POWER-2.0MK
★W902	610 305 3974	ASSY,WIRE GND CONECTOR C3

CABINET PARTS LIST



CABINET PARTS LIST

KEY NO.	PARTS NO.	DESCRIPTION
1	610 286 4977	ASSY, BUTTON POWER-C2GA
	610 286 7770	SPRING COIL-C2GA
2	610 305 0447	DEC IND-C3RK
3	610 305 0188	ASSY, BUTTON UNIT-C3RK
4	610 305 0270	ASSY, CABINET FRONT-C3RK
4-a	610 305 0348	CABINET FRONT-C3RK
4-b	610 305 7392	DOOR-C3RK
5	610 284 7741	DOOR COVER-C2SA
6	610 305 0454	DEC SHEET DOOR-C3RK
7	645 041 7269	BADGE, SANYO
8	610 305 0393	CABINET BACK-C3RK

ACCESSORY PARTS LIST

KEY NO.	PARTS NO.	DESCRIPTION
9	610 305 0652	LABEL RATING-C3RK
10	610 256 7670	HOLDER AC CORD-SGP-D4VA
11	645 059 0252	ASSY, RC TRANSMITTER-JXMRF
12	610 297 3723	RC-BATTERY COVER-JXMRA
	610 305 0614	OWNER,S MANUAL-C3RK

COMPONENT AND TESTPOINT LOCATIONS

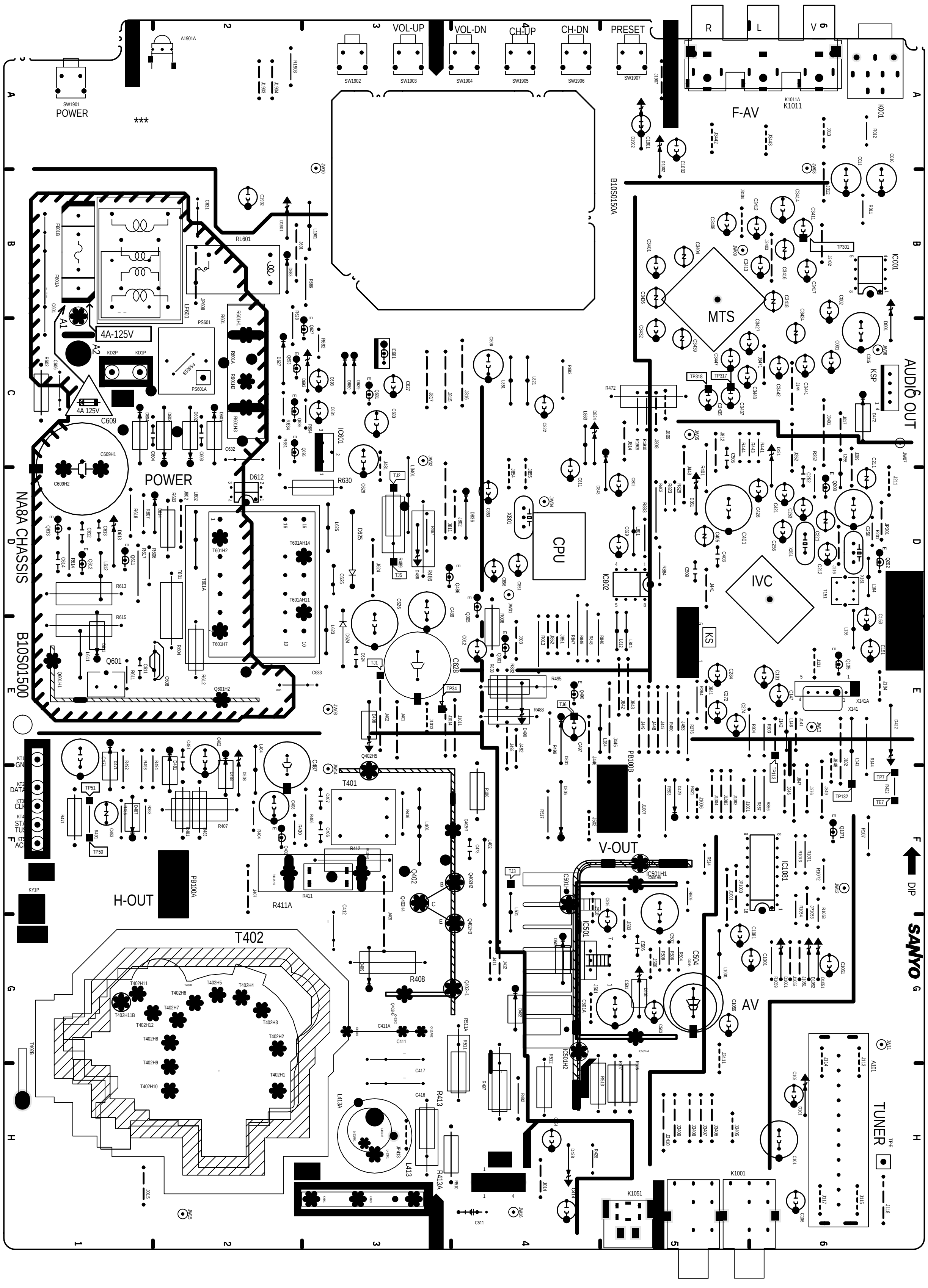
MAIN BOARD PARTS SIDE

CAUTION

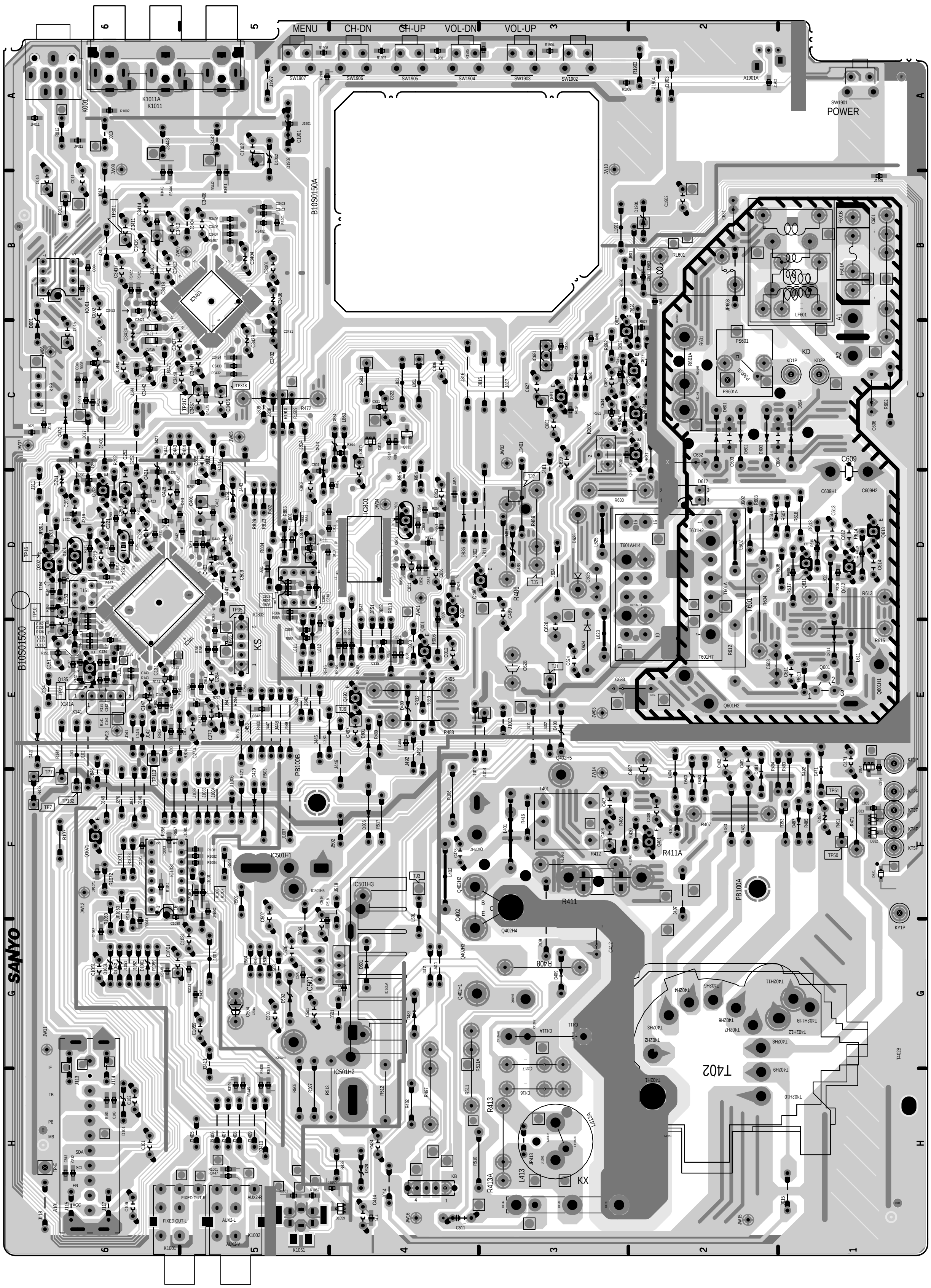
4A 125V

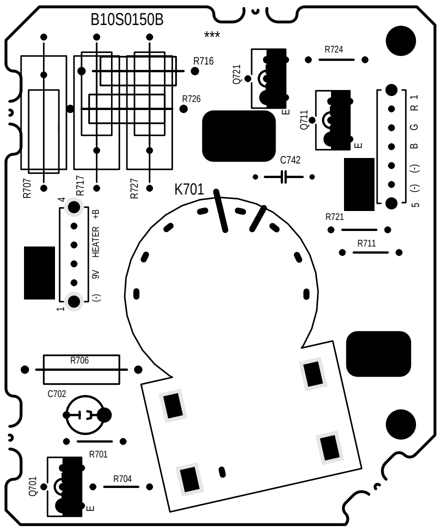
FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE, REPLACE ONLY WITH THE SAME TYPE 4A, 125V FUSE.

ATTENTION: POUR MAINTENIR LA PROTECTION CONTRE LES RISQUES D' INCENDIE UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE 4A, 125V.

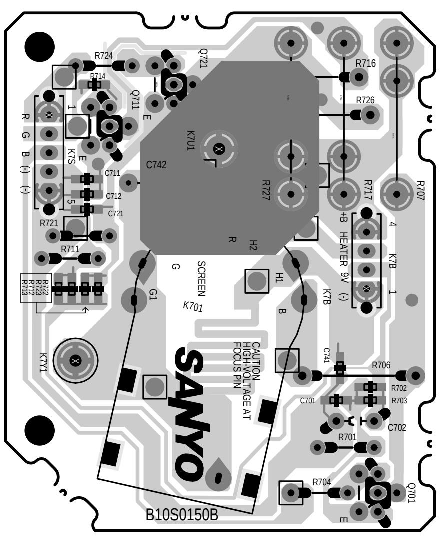


MAIN BOARD - Foil Side

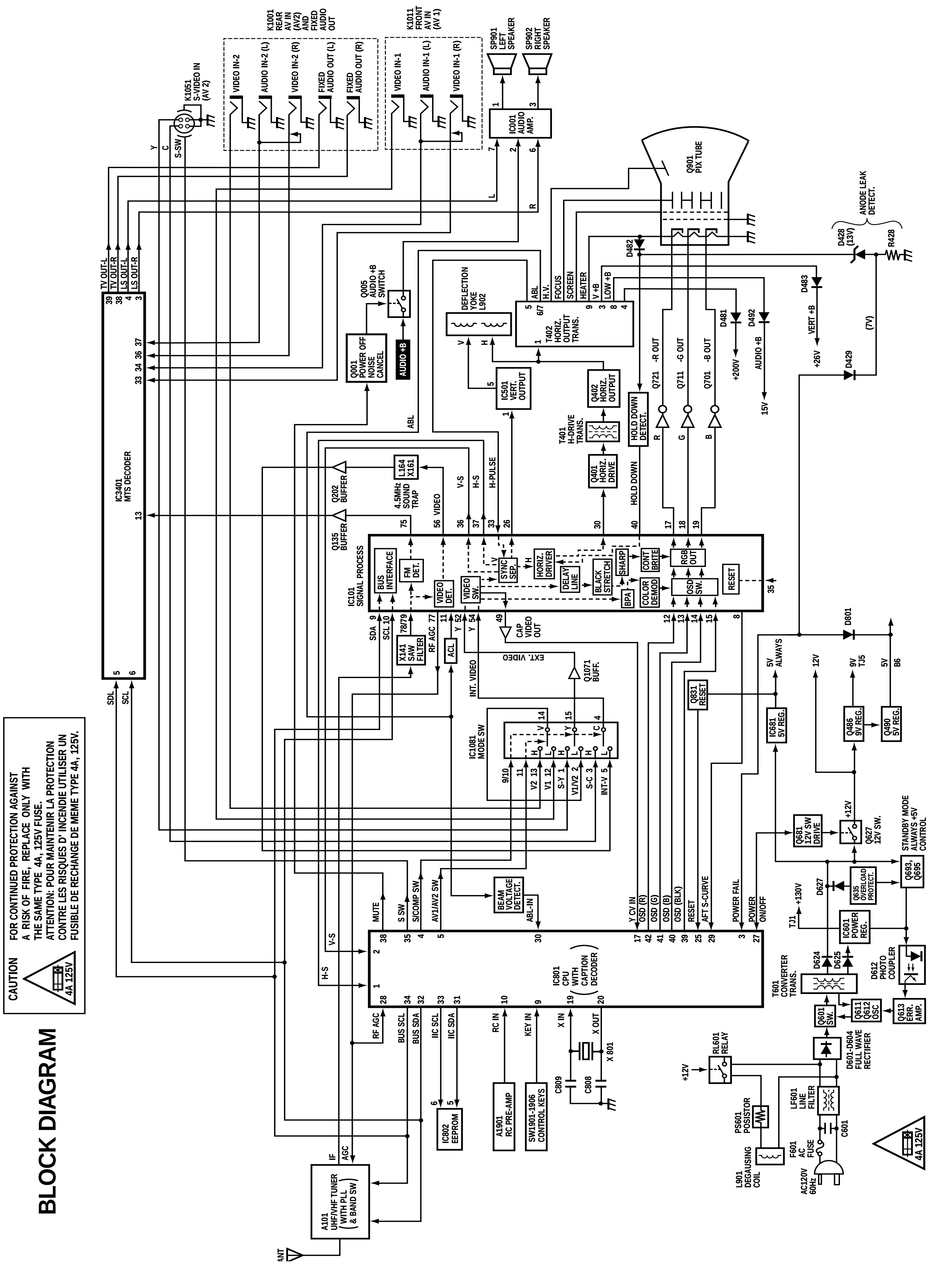




PICTURE TUBE SOCKET BOARD - Foil Side



BLOCK DIAGRAM



For parts or service contact

SANYO Fisher Service Corporation
21605 Plummer Street
Chatsworth, CA 91311 (U.S.A.)

300 Applewood Crescent,
Concord, Ontario L4K 5C7 (CANADA)

February / 2003 SMC

Printed in U.S.A.

MODEL DS20930 Chassis No. 20930-00

SCHEMATIC DIAGRAMS

NOTES ON SCHEMATIC DIAGRAM

1. All resistance values in ohms K=1,000 M=1,000,000.
2. Unless otherwise noted on schematic, all capacitor values less than 1 are expressed in µF (Micro Farad), and the values more than 1 are in pF.
3. Unless otherwise noted on schematic, voltage reading taken with VOM from point indicated to chassis ground. Voltage reading taken using color bar-signal on VHF channel 5, all controls at normal. Line voltage at 220 volts. Some voltages may vary with signal strength.
4. Waveforms were taken with color-bar signal and controls set for normal picture. Waveforms marked with an ✻ may vary with signal strength.
5. Symbol indicates a fusible resistor, which protects the circuit from possible short circuits.

SERVICE NOTES:

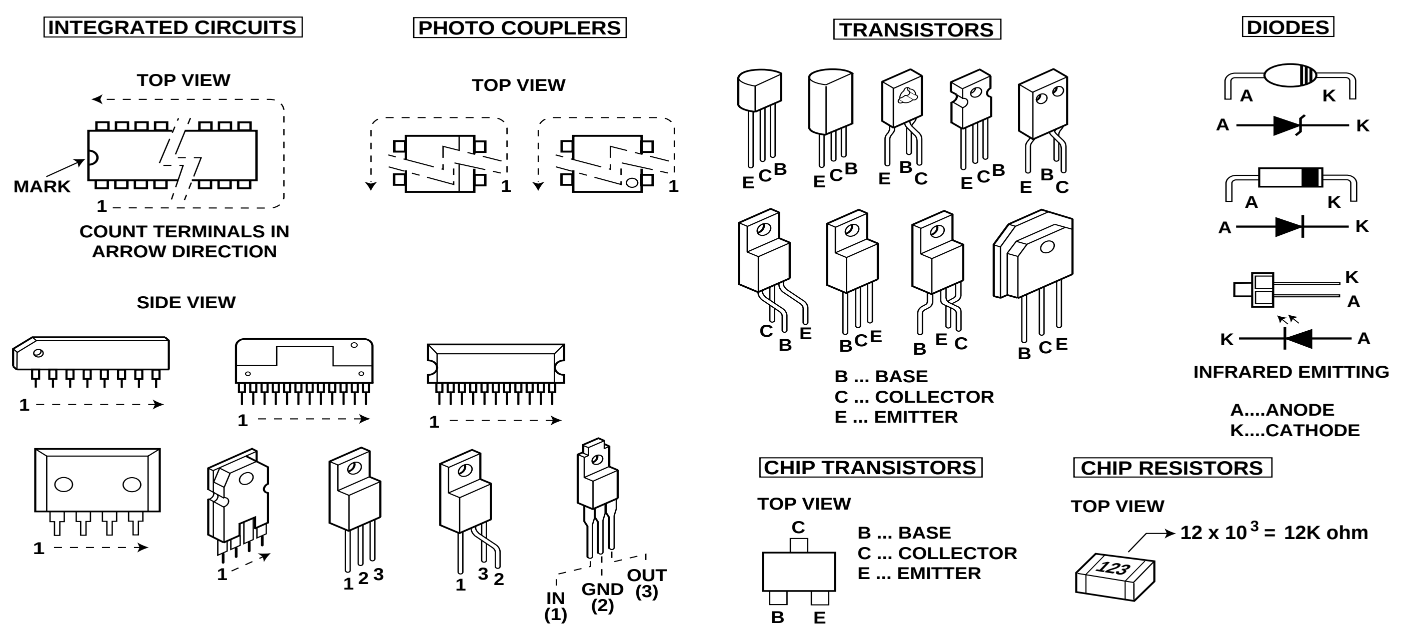
1. When replacing parts on circuit boards, clamp the lead wires to terminals before soldering.
2. When replacing high wattage resistors on circuit board, keep the resistor body 10 mm (3/8") from circuit board.
3. Keep wires away from high voltage and high temperature components.

PRODUCT SAFETY NOTICE

THE COMPONENTS DESIGNATED BY A STAR (★) ON THIS SCHEMATIC DIAGRAM DESIGNATE COMPONENTS WHOSE VALUES ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A STAR NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST. DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

X-RADIATION WARNING NOTE

THIS TV CONTAINS CRITICAL PARTS TO PROTECT AGAINST X-RADIATION. NOMINAL 2ND ANODE VOLTAGE IS 26.5KV AT ZERO BEAM CURRENT AT 120 VOLTS AC LINE, AND MUST NOT EXCEED 28.0KV UNDER ANY OPERATING CONDITION. SEE HIGH VOLTAGE CHECK ON PAGE 8.



CAPACITOR AND RESISTOR CODE CHART

CAPACITOR (Example)

500 C K 1500 B

- 500 — Voltage rating
- C — Material code
- K — Tolerance code
- 1500 — Value code
- B — Characteristics

Tolerance code:

- D .... ±0.5pF
- T .... +50% –10%
- J .... ±5%
- K .... ±10%
- M .... ±20%
- N .... ±30%
- P .... +100% –0%
- Z .... +80% –20%
- C .... ±0.25pF

Material code:

- C .... Ceramic
- E .... Electrolytic
- F .... Polyester
- N .... Polypropylene
- T .... Tantalum
- K .... Ceramic
- H .... MT-Composite
- P .... NP. Electrolytic
- M .... MT-Polypropylene

RESISTOR (Example)

6 Y K 4.7

- 6 — Wattage rating
- Y — Material code
- K — Tolerance code
- 4.7 — Value code

Tolerance code:

- D .... ±0.5%
- F .... ±1%
- G .... ±2%
- J .... ±5%
- K .... ±10%
- M .... ±20%

Material code:

- F .... Fusible
- N .... Metalized Carbon
- S .... Oxide Metalized
- Y .... Wire Wound
- C .... Solid
- D .... Carbon Film
- W .... Wire Wound

VOLTAGE CHARTS

Note: Voltages were measured with color-bar signal and controls set for normal picture.

Device/Pin #	Volts/Mode
D612-1	POWE ON: 30.0 / POWER OFF 10.5
D612-2	POWE ON: 29.0 / POWER OFF 9.4
D612-3	POWE ON: 0.7 / POWER OFF 0.4
D612-4	POWE ON: 16.0 / POWER OFF 1.7
IC001-1	6.5
IC001-2	15.2
IC001-3	6.3
IC001-4	GND
IC001-5	N.C.
IC001-6	1.4
IC001-7	1.4
IC001-8	GND
IC101-1	GND
IC101-2	GND
IC101-3	GND
IC101-4	GND
IC101-5	GND
IC101-6	5.1
IC101-7	2.1
IC101-8	2.7
IC101-9	3.8
IC101-10	3.6
IC101-11	4.3
IC101-12	1.5
IC101-13	1.5
IC101-14	1.4
IC101-15	0.2
IC101-16	8.2
IC101-17	2.5
IC101-18	2.2
IC101-19	2.4
IC101-20	GND
IC101-21	GND
IC101-22	GND
IC101-23	GND
IC101-24	GND
IC101-25	N.C.
IC101-26	2.1
IC101-27	2.6
IC101-28	5.3
IC101-29	2.7
IC101-30	0.4
IC101-31	GND
IC101-32	N.C.
IC101-33	1.0
IC101-34	1.8
IC101-35	N.C.
IC101-36	5.0
IC101-37	4.3
IC101-38	4.7
IC101-39	GND
IC101-40	0
IC101-41	GND
IC101-42	GND
IC101-43	GND
IC101-44	2.3

Device/Pin #	Volts/Mode
IC101-45	3.6
IC101-46	2.1
IC101-47	3.1
IC101-48	GND
IC101-49	2.5
IC101-50	GND
IC101-51	GND
IC101-52	2.6
IC101-53	5.1
IC101-54	2.9
IC101-55	2.6
IC101-56	2.5
IC101-57	GND
IC101-58	3.6
IC101-59	4.4
IC101-60	4.4
IC101-61	GND
IC101-62	GND
IC101-63	GND
IC101-64	GND
IC101-65	2.4
IC101-66	2.2
IC101-67	2.2
IC101-68	0
IC101-69	3.2
IC101-70	GND
IC101-71	GND
IC101-72	GND
IC101-73	2.3
IC101-74	GND
IC101-75	2.2
IC101-76	2.6
IC101-77	2.2
IC101-78	2.9
IC101-79	2.9
IC101-80	GND
IC501-1	2.5
IC501-2	26.2
IC501-3	2.4
IC501-4	GND
IC501-5	12.8
IC501-6	26.6
IC501-7	2.5
IC601-1	130.0
IC601-2	29.2
IC601-3	GND
IC681-1	13.4
IC682-1	GND
IC681-3	5.0
IC801-1	4.0
IC801-2	3.9
IC801-3	4.9
IC801-4	0
IC801-5	0
IC801-6	0.3
IC801-7	0
IC801-8	0
IC801-9	0
IC801-10	4.9

Device/Pin #	Volts/Mode
IC801-11	GND
IC801-12	4.8
IC801-13	GND
IC801-14	4.9
IC801-15	1.9
IC801-16	0.2
IC801-17	2.1
IC801-18	GND
IC801-19	2.2
IC801-20	2.0
IC801-21	GND
IC801-22	4.9
IC801-23	GND
IC801-24	GND
IC801-25	4.8
IC801-26	0.3
IC801-27	POWE ON: 4.9 / POWER OFF 0
IC801-28	3.9
IC801-29	2.6
IC801-30	0
IC801-31	4.9
IC801-32	3.6
IC801-33	4.9
IC801-34	3.7
IC801-35	4.8
IC801-36	4.9
IC801-37	4.9
IC801-38	4.8
IC801-39	0.2
IC801-40	0
IC801-41	0
IC801-42	0
IC802-1	GND
IC802-2	GND
IC802-3	GND
IC802-4	GND
IC802-5	4.9
IC802-6	4.9
IC802-7	GND
IC802-8	5.0
IC1081-1	2.5
IC1081-2	2.9
IC1081-3	2.5
IC1081-4	3.0
IC1081-5	2.5
IC1081-6	GND
IC1081-7	GND
IC1081-8	GND
IC1081-9	0
IC1081-10	0
IC1081-11	0
IC1081-12	2.9
IC1081-13	2.5
IC1081-14	2.9
IC1081-15	2.9
IC1081-16	9.3

Device/Pin #	Volts/Mode
IC3401-1	4.1
IC3401-2	4.1
IC3401-3	4.1
IC3401-4	4.1
IC3401-5	3.6
IC3401-6	3.7
IC3401-7	GND
IC3401-8	4.1
IC3401-9	4.1
IC3401-10	4.1
IC3401-11	4.1
IC3401-12	4.9
IC3401-13	4.1
IC3401-14	1.3
IC3401-15	1.3
IC3401-16	0
IC3401-17	GND
IC3401-18	3.2
IC3401-19	9.1
IC3401-20	0
IC3401-21	4.1
IC3401-22	4.1
IC3401-23	3.7
IC3401-24	3.9
IC3401-25	4.1
IC3401-26	4.1
IC3401-27	4.1
IC3401-28	1.9
IC3401-29	4.1
IC3401-30	4.1
IC3401-31	2.0
IC3401-32	4.1
IC34101-33	4.1
IC3401-34	4.1
IC3401-35	0
IC3401-36	4.1
IC3401-37	4.1
IC3401-38	4.1
IC3401-39	4.1
IC3401-40	4.1
IC3401-41	4.1
IC3401-42	GND
IC3401-43	4.1
IC3401-44	4.1
IC3401-45	4.2
IC3401-46	GND
IC3401-47	4.1
IC3401-48	4.1
Q001-B	POWER ON: 0.7 / POWER OFF: 0
Q001-C	POWER ON: 0 / POWER OFF: 6.3
Q001-E	GND
Q005-B	15.0
Q005-C	15.7
Q005-E	15.8
Q135-B	2.7
Q135-C	5.2
Q135-E	2.0

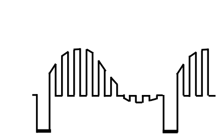
Device/Pin #	Volts/Mode
Q202-B	2.3
Q202-C	GND
Q202-E	3.0
Q208-B	2.5
Q208-C	GND
Q208-E	3.1
Q401-B	0.3
Q401-C	39.4
Q401-E	GND
Q402-B	3.2
Q402-C	132.4
Q402-E	–0.2
Q486-B	9.9
Q486-C	11.6
Q486-E	9.2
Q490-B	5.9
Q490-C	7.3
Q490-E	5.2
Q601-G	POWER ON: 0.1 / POWER OFF: 0
Q601-D	POWER ON: 163.5 / POWER OFF: 170.0
Q601-S	POWER ON: 5.6 / POWER OFF: 0.5
Q611-B	POWER ON: 4.6 / POWER OFF: 0.8
Q611-C	POWER ON: 15.7 / POWER OFF: 1.7
Q611-E	POWER ON: 5.7 / POWER OFF: 0.4
Q612-B	POWER ON: 5.4 / POWER OFF: 0.8
Q612-C	GND
Q612-E	POWER ON: 5.7 / POWER OFF: 0.4
Q613-B	POWER ON: 0.2 / POWER OFF: 0.1
Q613-C	POWER ON: 5.4 / POWER OFF: 0.9
Q613-E	GND
Q627-B	POWER ON: 12.7 / POWER OFF: 8.0
Q627-C	POWER ON: 13.2 / POWER OFF: 0
Q627-E	POWER ON: 13.3 / POWER OFF: 8.1
Q635-B	POWER ON: 4.0 / POWER OFF: 1.3
Q635-C	POWER ON: 29.0 / POWER OFF: 9.0
Q635-E	POWER ON: 4.0 / POWER OFF: 1.3
Q681-B	POWER ON: 0.7 / POWER OFF: 0
Q681-C	POWER ON: 0 / POWER OFF: 8.1
Q681-E	GND

Device/Pin #	Volts/Mode
Q693-B	POWER ON: 0.6 / POWER OFF: 6.7
Q693-C	POWER ON: 28.9 / POWER OFF: 7.8
Q693-E	POWER ON: 2.6 / POWER OFF: 6.1
Q695-B	POWER ON: 28.9 / POWER OFF: 8.8
Q695-C	GND
Q695-E	POWER ON: 28.9 / POWER OFF: 9.2
Q701-B	2.4
Q701-C	145.5
Q701-E	2.3
Q711-B	2.5
Q711-C	146.6
Q711-E	2.3
Q721-B	2.5
Q721-C	140.2
Q721-E	2.4
Q831-B	4.5
Q831-C	5.1
Q831-E	5.1
Q1071-B	2.9
Q1071-C	GND
Q1071-E	3.6

WAVEFORMS

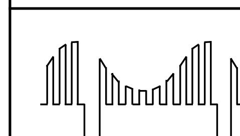
Note: Voltages were measured with color-bar signal and controls set for normal picture.

IC101 pin-17 (R-Output)



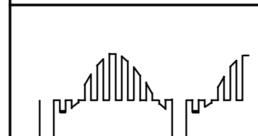
3.4Vp-p Horiz.

IC101 pin-18 (G-Output)



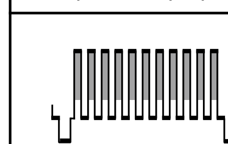
3.4Vp-p Horiz.

IC101 pin-19 (B-Output)



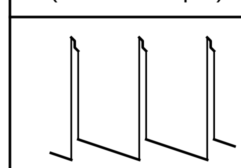
3.4Vp-p Horiz.

IC101 pin-52 (Video Input)



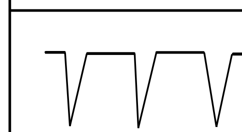
1.0Vp-p Horiz.

IC501 pin-5 (Vertical Output)



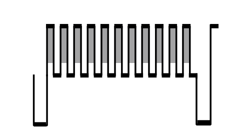
50.4Vp-p Vert.

IC501 pin-1 (Inverting Input)



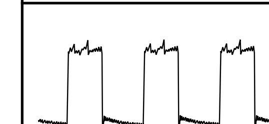
0.6Vp-p Vert.

Q202-E (TP16) (Inverting Video)



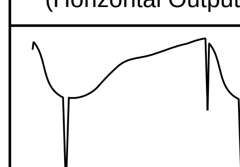
1.0Vp-p Horiz.

Q401-B (Horizontal Drive)



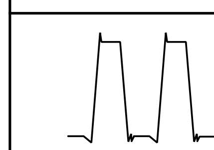
1.0Vp-p Horiz.

Q402-B (Horizontal Output)



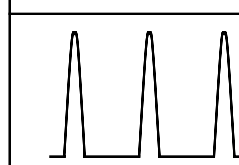
18.2Vp-p Horiz.

Q601-G (Power Switching)



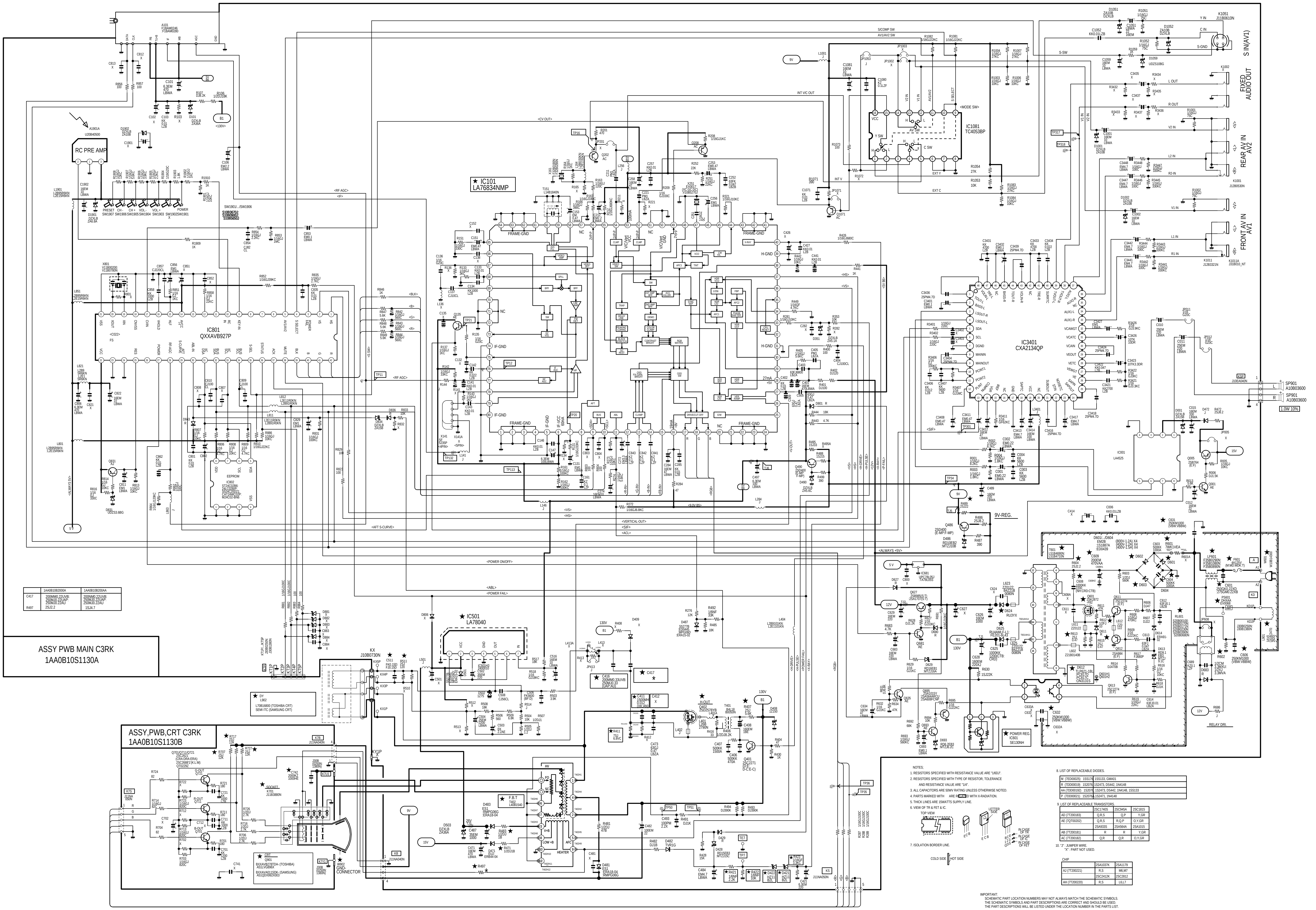
15Vp-p 50KHz

T402 pin-9 (Heater)



29.6Vp-p Horiz.

MODEL DS20930 Chassis No. 20930-00



CAUTION FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE, REPLACE ONLY WITH THE SAME TYPE 4A, 125V FUSE.

ATTENTION: POUR MAINTENIR LA PROTECTION CONTRE LES RISQUES D' INCENDIE UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE 4A, 125V.

4A 125V